THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XVII. No. 414—20th YEAR.] LONDON, SEPTEMBER 1, 1868. [Subscription per Ann. { 15s. in Advance / 18s. Credit.] DOUBLE No. Price 1s.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis by Dr. FYFE, M.D.:—
9746 cubic feet of gas per ton of coal.
26-candle gas.
13¼ cwt. coke per ton of coal.
N.B.—Ramsay's Cannel most resembles the Marquis of Lothian's Cannel, but superior as to coke.
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DO. GARESFIELD COKE.

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FIRE-BRICK WORKS, established 1804.
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These Meters are warranted to measure correctly and not to vary, and have come into general use more rapidly than any Meters hitherto manufactured.
1862.
CLASSES X. AND XXXI.
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JOSEPH COWEN and CO.,
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The Proprietors will, in future, use their own forms of bills of lading, and also issue certificates of origin, signed, as the case may be, either by JAMES FERGUSON & Co., or by the NITSHILL & LESMAHAGO COAL COMPANY; and they request all consumers purchasing Lesmahago Coal to demand such a certificate for each cargo, and to observe that it corresponds with the bill of lading.
Auchinheath, Lesmahago, March, 1868.

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JOURNAL OF GAS LIGHTING ONE PENNY NEWSPAPER

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HORSE SINGEING APPARATUS, best make, with GAS-BURNERS, COMBS, and INDIA-RUBBER TUBING, all complete.
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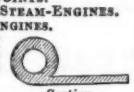
WASHERS for GAS and STEAM JOINTS.
VALVES (pure solid Rubber) for STEAM-ENGINES.
PACKING (Elastic) for STEAM-ENGINES.
FLANGE TUBING, for excluding Draughts and Dust through WINDOWS, DOORS, and GLASS CASES.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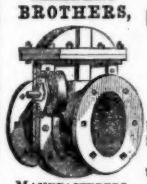

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Manufacturer of Clay Retorts, Fire-Bricks, and every description of Fire-Clay Goods.

THE

UNIVERSAL EXHIBITION OF PARIS,

1867.

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MINUTE CLOCKS, PRESSURE GAUGES, PHOTOMETERS, PRESSURE REGISTERS, &c.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

The report of the meeting of the North British Association of Gas Managers is unavoidably deferred till our next number.

NOTICES.

The subscription to the JOURNAL is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders should be made payable at the Money-Order Office, London, to William B. King, 11, Bolt Court, Fleet Street, by whom the business department of the JOURNAL is conducted.

The next number will be published on Tuesday, September 15, and the subsequent numbers on each successive alternate Tuesday.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

This JOURNAL has been duly registered at the General Post-Office for transmission abroad.

All communications for the Editor to be addressed, "No. 42, Parliament Street, Westminster;" and all remittances for subscriptions or orders for advertisements to the Publisher, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, SEPTEMBER 1, 1868.

Notes upon Passing Events.

MR. ROBERT RAWLINSON, C.B., is really incomprehensible; his hand seems to be against every local engineer. In the matter of Walton, a suburb of Liverpool, he has been making a characteristic exhibition of his temper and his determination to bear no rival near the throne of sanitary science to which he has elected himself. The story is as follows:—Last year Messrs. Goodison and Reade, civil engineers, of Liverpool, prepared a plan for the disposal of the sewage of Walton and West Derby, with an appendix of "Facts in Sewage-Farming." The report, after giving the details of a plan for collecting the sewage of Walton and West Derby, proposed to distribute it over a particular tract of land of a sandy, porous character, to be leased or purchased for the purpose. The scheme seems to have been carefully thought out and planned, with the advantage of an intimate knowledge of the whole district. The engineers selected purely agricultural land let at £2 10s. to £3 per acre, "far removed from other than farm-"houses, and not likely to be used for other than agricultural "purposes." This land was shown to Mr. Rawlinson before Messrs. Goodison and Reade made their report, and he, it is alleged, expressed a favourable opinion of it, stating that "on such land fifty thousand tons of sewage per acre "could be disposed, and that it was only a question of "how little should be used." He also remarked that the form of the land "was such that it could be laid out "for a sewage farm at a trifling cost—viz., from forty "to fifty shillings per acre." After this communication, and with printed evidence of Mr. Rawlinson extending over twenty years, and coming down to last year, in favour of irrigation as a means of disposing of town sewage, "*even on* "*stiff clay soil*," the surprise of Messrs. Goodison and Reade may be imagined when they found their scheme opposed in a report of Mr. Rawlinson. Although he "formally approved "the plans, sections, estimates, and details for main sewers" prepared by Messrs. Goodison and Reade, and considered them "well and properly devised," he objected altogether to the irrigation scheme on general grounds, and recommended that all the sewage should be conveyed either along the inland brooks and river Alt, or "by an artificial outlet through the docks into "the deep water of the Mersey." Although it suited Mr. Rawlinson to thus snuff out the plans of the local engineers in a mass of common-place generalities that would have applied just as well for any place in the kingdom, seen or unseen, it did not suit Messrs. Goodison and Reade. They prepared a counter report, in which Mr. Rawlinson's inconsistency is dissected in a merciless manner. They quote Mr. Rawlinson's official reports, and Mr. Rawlinson's evidence on sewage irrigation, against himself, going over ground too familiar to be here repeated. They exhibit him very recently recommending the application of sewage to the cultivation of the stiffest clay, and they conclude by observing that Mr. Rawlinson gives "no local facts or figures;" the cost of the two schemes are not contrasted in any way; none of the cultivations are dealt with; and they point out that, if the outlet proposed by Mr. Rawlinson be accepted, *the internal arrangements which he praises and approves must be remodelled*, because under the local plan the whole of the sewers follow the natural inclination of the land, while, to fit Mr. Rawlinson's plan of outlet into the Mersey, "some of the main sewers and all the tribu-"tary ones would fall against the natural gradients of the "surface!" We can only account for such a patent blunder on the part of a sanitary engineer of considerable experience by the theory that he keeps a stock of skeleton reports, as some parsons keep skeleton sermons, to be filled in according to circumstances. Some totally smash a rival of importance; others mildly snub a too presumptuous provincial brother; others reduce the ambitious scheme to mere bricklayers work, by castrating the only important and original feature. The audacity of two country engineers daring not only to charge, but to convict Rawlinson, C.B., of inconsistency, by quotation from his own reports on Liverpool, Manchester, and Croydon, was too much for Mr. Chadwick's pupil's patience. He could not

have been more angry if, like his late colleague, Messrs. Goodison and Reade had been "advocates of the midden interest." He exploded in a letter to one of the Liverpool papers, full of sneers and sarcasms at his opponents "presumption"—"egotism"—"engineering abilities." However, all his official power will not enable him to eat his printed words, and Robert Rawlinson, C.B., remains self-convicted of a degree of professional inconsistency which would be disgusting if it were not ridiculous, as the following short specimens in parallel columns will show:—

Mr. Rawlinson's Report in favour of Utilizing Sewage.

At South Norwood and at Worthing clay land, out of which bricks are made, is irrigated with town sewage, and produces from 40 to 50 acres of Italian rye grass to each acre.

Report on the Aire and Calder.

Sewage irrigation may be carried on throughout the entire year, and grass may be cut at Christmas.

The Local Board of Ormskirk may be informed that they ought to purchase or lease not less than 50 acres of land as near the outlet sewer as possible, and on this land the sewage should be applied daily in a fresh state.

If steam pumping be necessary, this should be provided by the Board, and the sewered farm let, even if it does not produce any income.

By avoiding any pollution of the watercourse, they will effectually prevent litigation.

Report in favour of Pouring Sewage into the Mersey.

There must be a suitable soil, appropriate seed, fine weather, economical management, and means regularly to dispose of the sewage grown. To fail in any single step of the process will be so much loss. Sewage-farming requires both special adaptation and special management.

Any village or town on the river Mersey, from Runcorn down to Liverpool, may harmlessly waste sewage into this estuary.

Bootle, Waterloo, and Southport, dependent on summer visitors, must consider their own specialities, and prevent shore pollution.

If you tie yourselves up with the pumping scheme, you must everlastingly pump.

The anglers are, as a rule, a body of most respectable enthusiasts who, in a sanitary and picturesque point of view, do great service in river reform; indeed, in this respect, as well as in the innocence of their pursuits, they present a strong contrast to the sportsmen of the racing world, who are equally active in deteriorating the breed of horses and lowering the moral tone of the nation. But the anglers certainly have a most extraordinary idea of the value of their hobby. They are a talking class and a writing class, and thus manage to fill with their opinions and adventures a very large space in the more aristocratic journals devoted to sport. The cultivation of salmon is a very praiseworthy object, and the result in cleansing our rivers an incidental advantage of no small value, but there are some things of even more value than salmon at a shilling a pound. One of them is bread. A sporting contemporary does not seem to think so; he is extremely shocked that a party of rioters in North Devon should have spoiled a barrier for the protection of fish in order to set a number of mills to work at grinding corn. From the report of the *North Devon Journal* it would seem that the conservators at Umberleigh, not remembering the fate of the nobleman who told the French peasant who cried for bread, just before the Revolution, to eat cheese, had the bad taste to recommend the Devonshire labourers who complained that they could not get flour from the mills for their bakings, to "eat more cheese." Salmon protection and cultivation are new and useful ideas, but it would seem as if the officials who were charged with carrying them out had already reached the region of red tape. Water-mills are often a very great nuisance, injuring large tracts of valuable land, and doing very little work; some making use of steam-power for most of the year, and yet keeping up their dams. These should be suppressed on equitable terms, but the idea of keeping a whole district on a short allowance of flour in order that a few salmon may afford sport to a few anglers is really too absurd. There are, it seems, one-idea'd anglers who would paraphrase Lord John Manners's unfortunate couplet, and cry—

> Let mining, milling, trade, and commerce die,
> So that I catch my salmon with my fly.

The following is the paragraph which excited the legal indignation of the angling luminary:—

UMBERLEIGH MILLS.—In last week's *Journal* appeared a paragraph representing the very great inconvenience experienced by the inhabitants of this neighbourhood, in consequence of the almost entire suspension of the milling power by the erection of a fish pass, according to the requirement of the Salmon Fisheries Act. We had hoped that before this the conservators would have recommended to the Home Office some relaxation of the restrictive and unjust clauses which are pressing with great disadvantage upon a large body of people. It may not be generally known that all mills on small streams in Highbickington, Roborough, Yarnscombe, and this parish, have ceased to work, owing to the scarcity of water; and, notwithstanding this extraordinary and unprecedented occurrence, red tapeism will not allow the water to be diverted from the fish pass at Umberleigh at a time when it is an utter impossibility for salmon to ascend. Conservators should be men of judgment, who would sympathize with the aggrieved parties instead of stupidly telling rustics to "eat more cheese in lieu of bread." As it is, they appear to be satisfied with the present absurd and oppressive arrangement, and are evidently opposed to any change whatever, reckless of consequences that may result. Such a state of things cannot much longer continue, unmistakeable language being used to show that the people at large are determined to take action in the matter, and ascertain if right and common sense are for ever departed from amongst us. Last evening (Wednesday) at 7.30, a mob of about 100, armed with axes, shovels, and tools of various descriptions, started from the village for the mills, the number being greatly reinforced on the road. On their arrival at Umberleigh the crowd could not have been far short of 300. In about an hour the fish pass was successfully blockaded, loads of stones, timber, and clay being used for the work. The fenders were then let down, and in about five minutes the water was sufficient to work the mills, the massive doors of which were immediately forced open, the miller (Mr. Guard) was called upon to work, and the mills were set in motion, loud and prolonged cheering testifying the general joy. Cheers, groans, and laughter were given for the conservators, amidst cries of "We'll have bread with our cheese." Darkness now set in, and the proceedings were brought to a close by a wag in an adjoining orchard shouting "Here's Whyte." A good pack was quickly on the scent, and good fun was made ere the trick was discovered.

Miss Becker's demonstration in favour of the rights of women, at the meetings of the British Association at Norwich, made a sensation, because it was well written and well delivered; it quite eclipsed Mr. Joseph Payne. No wonder, if he is the magistrate who makes himself so ridiculous with his doggerel lines at ragged and other school meetings. Miss Becker, we have no doubt, would have made a better advocate and a much more dignified judge than that amiable and absurd person. It is to be hoped that Miss Becker will repeat her paper in some place where it will be the only subject of discussion. We might, perhaps, then learn what is the position that Miss Becker desires her sex to achieve. As long as she dwells on the miserable, frivolous, superficial education that women at present receive, she will obtain the assent of all who have paid any attention to the subject. All the Assistant-Commissioners on Education agreed in reporting that, as a rule, girls learn very little at school, but quite as much as their parents desire. A young lady educated at a fashionable school at a cost of over a hundred a year will return home, at seventeen or eighteen, at best able to play brilliantly the fashionable music of the day, to enter a room and dance gracefully, to dress herself according to the prevailing fashion. She may speak French with not a very English accent, and have a nominal acquaintance with German and Italian; but of her own language, or the standard works of English literature, she will be profoundly ignorant and indifferent. It is only exceptions who are able to write a letter of any importance with clearness and precision, not to say elegance and force. In a word, she knows nothing that will enable her to usefully occupy her mind, or render her the companion and partner of a sensible man, with his way to make in the world in any intellectual profession. Why the education of girls is flimsy and superficial the reports of the Commissioners on Education explain. There is no demand for anything better. We have heard Miss Becker's theories: we should like to know her plans. It has been shrewdly suggested that women cannot be soldiers or sailors. In America they are sometimes doctors and preachers. We should not object to their being attorneys, although there would be some difficulties in the way of female articled clerks, and the students for the bar would at first need some modern Portia to open chambers for their instruction. But here we are obliged to stop, because it is difficult to see how women, however educated, are to go through the needful training for architects, engineers, or surveyors. If they are to climb ladders, walk over rafters, and scramble through ditches and hedges, the dress must be changed, and we must get back to bloomers. Merchants, produce brokers, and ship brokers, are junior clerks, if not office-boys first. Ladies who despise the needle, and expect a husband to sew on his own buttons, order his own dinners, and nurse his own children, will also disdain the preliminary labours that fall to junior males in all commercial pursuits. Of course, women do not desire to take any share of man's manual labours; it is one of the objects of civilization to take women from carrying burdens and digging in the fields. If, then, we understand Miss Becker rightly, she wishes women to take a share in all profitable intellectual pursuits, and leave all the hard work to the men. Wives are not to attend to housekeeping: that will be the business of a butler of the inferior sex. They are not to sew: that is to be done by a boy and a sewing-machine. Mending stockings will perhaps be performed by a detachment of the shoe-black brigade. The wife, relieved from all domestic cares except bearing children, is either to earn an income by some intellectual pursuit on her own account, or to go into partnership with her husband as a surgeon or lawyer. Well, this may answer finely when the world accepts the notion for

intellectual women, capable of acquiring the arts, sciences, and useful knowledge by which money is earned; but what is to become of the stupid ones, who do not like study of any kind, who will not read books, and are no more capable of retaining what they read than a sieve is of holding water? Because Miss Becker must admit that there are stupid women, in a literary sense, as well as stupid men. Men who have no talent for intellectual pursuits find places where their arms, legs, and energies make up for the want of more refined qualities. For instance, a man may be a very successful ship broker without being able to say much about Shakespeare and the musical glasses. However, as has been observed by one of the powerful organs of public opinion, there are ladies in England with superfluous means quite sufficient to establish a model college for women. Let it be done—let us know what the curriculum ought to be. But, before we follow Miss Becker into unknown regions, which are to produce a race of female authors, musicians, painters, orators, lawyers, and physicians, superior to anything female the world has ever seen, we should be glad to see some practical steps taken for imparting to girls of all ranks the sort of education which would be useful and amusing to them in real life—some subjects of conversation beyond dress, fashion, and the notabilities of their circle of acquaintance; some occupation beyond the iteration of tunes on the piano, and the execution of acres of useless needle or embroidery work. According to our experience, women of sense and capacity begin their education when they leave school, or when they are married. But, after Miss Becker's "high fallutin" essay, it may be amusing to read the following account of her own sex from "a private governess, "who has held situations in different families, chiefly of high "rank," which is given in Mr. Giffard's report on education in the extra-metropolitan counties:—

I have taught both boys and girls, and have had frequent opportunities of comparing them. The difficulties in the performance of my present duty are legion. The chief of them is the flightiness of the female character. Girls are not deficient in quickness, they are often quicker arithmeticians than boys. They are deficient in retentiveness; they learn only for a moment. Girls require constant *surveillance;* their conversation must be carefully kept within bounds. It is impossible for girls to retain a proper tone if left to themselves. One bad girl will corrupt all the rest. I think twelve is the largest number of girls that can with advantage be superintended by one person. The ages of my pupils vary from ten to seventeen years; they are never out of sight of a governess from morning to night. If I contrast boys with girls, I find the girls have less truthfulness, less sense of honour, less sincerity of affection. You can appeal to a boy's affections or sense of honour, not to a girl's. I have compared girls of the middle class with girls of the upper class, and find they are less truthful and honourable; their great fault is deceitfulness.

Surely this lady must have been the friend of the writer of those celebrated articles in the *Saturday Review* on women and girls.

The correspondence in the *Times*, the other day, on the question of the Fraser and Palliser guns, in which Colonel Campbell and the Hon. Colonel Anson, M.P., took part, was only one more illustration of the impropriety of making inventive officials the judges of other people's inventions. Colonel Anson—the son and brother of an earl, a distinguished soldier, with all the Conservative sentiments of a man of his position and connexions—asserts that, when Captain Palliser sent a plan for manufacturing a cheap gun by a combination of wrought and cast iron, he found a rival in the department that was to decide on his invention, and that, by the influence of departmental prejudices, the cost of the Palliser gun was increased and the cost of the Fraser gun diminished; the Palliser gun unfairly tried and unfairly reported on; and, finally, £5000 given to the official, Captain Fraser, while Captain Palliser was left "out "in the cold." This shows, as in the case of the Admiralty and the turret ships, that there is need of some independent technical tribunal, raised above the interests of patentees, to decide on the mechanical improvements and inventions required for the use of the nation. In the same direction does the result of Mr. Seely's select committee on Admiralty accounts show that departments are not to be trusted to reform themselves. Mr. Seely, who understands handling figures much better than handling men, found his report opposed by two other reports. Lord Henry Lennox, the present Secretary to the Admiralty, fought tooth and nail for his office, denied everything, and declared in his draft that everything was perfectly well managed. Mr. Childers, the ex and future Secretary to the Admiralty, prepared a compromise report, which was carried. He accepted the reforms in the shape of the accounts, and passed by the serious charges which, of course, Admiral Robinson and Mr. Reed had contradicted. There seems to have been one little passage-at-arms not reported in the minutes, of which we have a hint in the following words:—

June 15, 1868.—Captain Sherard Osborne, R.N., made a statement to the committee repudiating attacks made on his character by Lord Henry Lennox and others. Lord Henry replied. Room cleared; committee deliberated. Resolved that the offensive question put to Captain S. Osborne shall be modified, and that Captain Osborne's remarks relative to Lord Henry Lennox shall be struck out.

Mr. Seely's report stated that the excess paid over and above the market price by the Admiralty for its anchors between 1841 and 1867 amounted to £170,000, that the form of anchor supplied under the favoured contract was placed last but one out of eight competing plans by a committee that reported on the subject, and that no sufficient trial had been given to Trotman's and other rival systems which differ from the Admiralty. The history of the purchases of chain cables affords a parallel to the history of Admiralty anchors. From 1854 to 1863 the Admiralty have paid for chain cables in excess of the market the sum of £73,780. In both instances Messrs. Brown, Lennox, and Co. were the favoured contractors. According to the evidence of Mr. Samuda—who is, of course, contradicted by the controller, Admiral Robinson, and the chief constructor, Mr. Reed—the excess of cost of ironclads built in Her Majesty's yards between 1858 and 1865 was more than one million on an expenditure of three millions. We stop here for the present, with the hope that Mr. Seely will obtain active assistance in the new Parliament.

Circular to Gas Companies.

The anomalous position in which ten of the metropolitan gas companies have been placed by the City of London Gas Act and the Chartered Company's Act, has no doubt rendered them more open to attack than they were before the passing of those Acts, and it behoves them to consider in time what course they will adopt under the altered circumstances. At a recent meeting of the St. James's vestry, resolutions were passed to the effect that the Western Gas Company, which lights a large portion of the parish, should be requested to adopt the provisions of the City of London Gas Act, and that, in the event of non-compliance, application should be made to the Chartered Company to light the whole of the parish, or to supply gas in bulk to the vestry to enable them to do so. The reply of the directors of the Western Gas Company to that somewhat impudent request was made known at the ordinary general meeting of the company on the 27th ult., and it is important as an indication of the views entertained by the other companies not affected by the City of London Gas Act. The directors commence their reply by stating succinctly that the vestry required them to do that which the ten companies not supplying gas within the City had declined to do when before the select committee of the House of Commons—namely, to surrender the rights granted by the Act of 1860. To that request, thus plainly stated, the directors said they had no alternative but to give a negative. They then proceed to remark on the threat with which it was intended to enforce the demand—that the vestry would, if their request were refused, ask the Chartered Company either to light the whole of the parish or to supply gas to them in bulk—which propositions are truly characterized as an endeavour to override the mutual compact between the public and the gas companies, sanctioned by the Act of 1860, for the retention by the company of the exclusive supply of their district so long as they observed the conditions specified by that Act, which the vestry of St. James had assisted in obtaining, and which conditions there was no pretence for asserting that the company have in any way broken. The directors point out that, as regards the price and illuminating power, the provisions of the City of London Gas Act and the Chartered Company's Act are only experimental for one year, and that they are to be altered if they prove insufficient to admit of the payment of 10 per cent. on the entire share capital of the Chartered Company; "so "that, assuming the price at which the Chartered Company "can ultimately supply gas to be a standard to which other "companies must conform, that standard has yet to be ascer-"tained." The directors then claim credit for the Western Company for having initiated, without the smallest pressure, a reduction in the price of gas, before having accumulated any of the authorized reserve-fund; and they state that at the present time their gas, considering its high illuminating power, is as cheap as any in the metropolis. Under such circumstances

the directors observe that it must be evident their company have given no occasion for unfriendly action, and that any such proceedings as those proposed by the vestry would be premature until the result of the trial working of 1870 is ascertained, and would therefore involve both parties in needless expenses, which cannot be for the benefit of the consumers of gas. The directors of the Western Company, it will be perceived, take their stand on the Act of 1860, modified by such concessions as, in the spirit of that Act and in regard to the public interest, they have been induced to make; and the manner in which they present the question at issue in respect to price and illuminating power seems so fair and reasonable as scarcely to admit of dispute. A committee of the House of Commons which showed itself most adverse to the metropolitan gas companies nevertheless admitted the principle that the companies are entitled to receive 10 per cent. of the profits on their share capital, and that the price and illuminating power of the gas should be so regulated as to enable them to realize that amount. But, by way of ascertaining whether, by increased care and economy in management, it might not be possible to maintain the prescribed amount of dividend with a reduced price and an increased illuminating power, they provided that there should be a year of trial, after allowing upwards of twelve months for preparation, and that year is to be 1870. It will then be seen whether, with due care and economy, 16-candle gas can be supplied in London at the price of 3s. 9d. per 1000 feet, with a profit of 10 per cent.; and if it cannot, the price and illuminating power are to be regulated accordingly. The experiment is to be tried not only within the condensed area of supply of the City, but in the more expanded area of the Chartered Company in Westminster and Clerkenwell, and will, therefore, be extensively applicable. Should the experiment be satisfactory, then the other metropolitan gas companies would have no excuse for not adopting the same standards of price and illuminating power, and they could not withstand the demand to do so. The experimental year would, at all events, prove what should be the standards of price and illuminating power, with regard to the maintenance of a profit equal to 10 per cent., and further legislation might then be founded on a satisfactory basis. To attempt to extend the area of experiment at present would be sheer waste of money, and we doubt whether even a Cardwell committee would countenance such a project. All that is required is the delay of a year, and surely the most impatient gas agitator might bide that time. It may, however, be a question with the gas companies whether several parts of the machinery of the City of London Gas Act might not be adopted with advantage. The provisions respecting the appointment of gas referees and examiners, and an inspection of accounts by a public auditor, are all consistent with the principle of the Act of 1860; and the adoption of those portions of the Metropolis Gas Bill of last session to which the companies offered no objection, might have the effect of giving confidence to the public that their interests were attended to, and would strengthen the companies in resisting further attacks on their property.

The conditions on which the sales of gas-works are effected are now watched with much interest by gas companies, and by the proprietors of such works, in consequence of the increasing favour with which the proposal is received to transfer the supply of gas throughout the country to local authorities. The transfer about to be made of the gas-works at Peterborough, under the award of an umpire to whom it was referred to determine the value, is the most recent transaction of the kind. The gas-works at Peterborough have for some years past been carried on by the owner, Mr. James Sawyer, with satisfaction to the public and with profit to himself. In 1854 Mr. Sawyer contemplated forming a company, and gave the requisite notices for obtaining an Act of Parliament for the purpose, but he abandoned that intention at the request of the Improvement Commissioners, and nothing had since occurred to disturb the good understanding existing between him and his customers until about a year ago, when an enterprising firm of contractors issued a prospectus for the formation of a company to light Peterborough with gas, the capital proposed being only £10,000, in shares of £10 each. The prospectus is worth notice as a specimen of the delusion that frequently exists respecting the amount of capital required to establish and carry on such an undertaking. Peterborough was represented to be a city which possesses peculiar facilities for the conveyance of coal, so that gas could be manufactured and supplied there at less cost than in neighbouring towns, with remunerative profit. It was stated that the shares were limited to £10, for the purpose of enabling each householder to become a shareholder, and thus "participate in the profits which "every light he burns will assist in making." The main desire of the promoters of the scheme was asserted to be, to benefit the public and to abolish the monopoly which had so long existed at Peterborough in the supply of gas. The company seem, however, to have been advised that they could not break up the streets for laying their mains without the authority of Parliament, and in due time they lodged a draft of a bill for authorizing them to raise a share capital of £20,000, and to borrow £5000. Mr. Sawyer on his part also gave the requisite parliamentary notices, and prepared the draft of a bill, when an offer was made to him by the company to purchase his undertaking at a valuation, to which he acceded. On the 10th of December last an agreement was accordingly entered into for the purpose, in which Mr. Barlow was named as arbitrator for Mr. Sawyer, and Mr. G. W. Stevenson for the company, Mr. O'Malley, Q.C., having the appointment of the umpire in the event of the arbitrators failing to agree. Five of the shareholders and the solicitor of the company joined in the agreement as sureties for the performance of the contract, and became liable jointly and severally to its obligations. The Act received the Royal Assent on the 25th of June, the capital of the company having been further raised to £30,000, and the borrowing powers to £7500. The maximum price of gas was fixed at 5s. per 1000 feet, and the standard of illuminating power at 14 candles, which was the quality of gas supplied by Mr. Sawyer for some years past at 4s. 6d. per 1000 feet. In those respects the consumers have, therefore, gained nothing by the change, the promised advantages held out by the prospectus notwithstanding. The arbitrators having failed to agree on an award within the time prescribed by the Lands Clauses Consolidation Act, their functions as arbitrators ceased, and the question was referred to Mr. O'Malley alone, who had been appointed umpire instead of nominating one, on the somewhat unusual conditions that neither counsel nor attorneys should take any part in the arguments or discussion excepting on the express request of the umpire, but that Mr. Barlow and Mr. Stevenson should state their respective views and arguments; it being the wish of both parties to the agreement that, as far as possible, the reference might be confined to an adjudication on the points of difference. The accounts for four years preceding May 9, 1868, had been examined by two accountants, who certified that the gross profits for the last year were £2240 13s. 10d., and so far there was a full agreement between the parties; but in applying those figures the arbitrators had differed considerably, as will be seen from the following copies of their respective valuations, Mr. Barlow's having amounted to £27,497 and Mr. Stevenson's to £20,414.

Mr. Barlow's Valuation of Peterborough Gas-Works.

Profit for the year ending May 9, 1868, as shown by the audited accounts				£2,240 13 10
Deductions—				
Average cost of repairs for 4 years, at 1s. 6.31d. per ton, on 3227 tons of coal carbonized in 1868.	£246 3 10			
Less amounts charged, viz.—				
Renewals, &c.	£146 5 5			
Retorts	5 18 2			
	152 3 7		£94 0 3	
Stationery and general charges, at the average cost for 4 years of 1d. per ton of coal carbonized			13 8 11	
Salary of a manager			150 0 0	
Book-keeper and collector	£75 0 0			
Less amount charged	27 10 7			
			47 9 5	
Bad debts, 1 per cent. on the private rental of £2700			27 0 0	
Interest on £1000 of floating capital			50 0 0	
Depreciation and renewal fund, 1 per cent. on £13,000			130 0 0	
				511 18 7
Net profit				£1,728 15 3
£1728 15s. 3d. at 16¾ years purchase		£28,812 14 2		
Eight surplus retorts, at £15		120 0 0		
Surplus land		200 0 0		
		29,132 14 2		
Less depreciation at £130 per annum for an average of 10 years, at 5 per cent. compound interest		1,635 0 0		
		£27,497 14 2		

Mr. Stevenson's Valuation of Peterborough Gas-Works.

1867-68. Balance of profit, as found in Mr. Sawyer's accounts					£2,240	13 4
Further deductions proper to be made—						
Expenditure of maintenance of buildings and machinery to bring it up to the average of 1865 and 1866, before Mr. Sawyer contemplated selling the undertaking, 1s. 5.4d. per ton carbonized on 3227 tons, £234, less £118 allowed	£116	0	0			
Wear and tear of retorts, 1d. per 1000 feet of gas made, £116, less £6 allowed	110	0	0			
Expenditure on maintenance of mains and services, average of 1865-66, 2.8d. per ton, £37 12s., less £25 allowed	12	12	0			
Manager (nothing allowed)	200	0	0			
Clerk and book-keeper (nothing allowed)	80	0	0			
Collector, 1½ per cent. on the private gas-rental of £2946, £44 4s., less £27 10s. allowed	16	14	0			
Bad debts, 1 per cent. on private gas-rental of £2946 (nothing allowed)	29	9	0			
Stationery and general, the average of 1865-66, 1.5d. per ton, £20 3s., less £3 allowed	17	3	0			
Interest on £1000 floating capital	50	0	0			
Depreciation, 1 per cent. on structural value of £13,000	130	0	0			
					761	18 0
Net annual profit					£1,478	15 4
£1478 15s. 4d. capitalized at 16⅔ years purchase, say					£24,647	0 0
Deduct—						
Depreciation at 1 per cent. per annum on structural value, or £130, for an average of 12 years, at 5 per cent. compound interest	£2,069	0	0			
Cost of renewing 28 retorts burnt out, at £8 each	224	0	0			
The necessary revision of main pipeage	500	0	0			
Cost of increasing the present gasholder room from 68,000 cubic feet to 140,000 cubic feet, or equal to the daily make in mid-winter, 72,000 at 20s.	1,440	0	0			
					4,233	0 0
Value of works and undertaking					£20,414	0 0

The above does not include stock in trade.

The umpire heard patiently all that the valuers had to say in support of their respective estimates during three sittings, and he ultimately awarded £25,786, exclusive of the unapplied stock, that amount being £1711 less than the sum asked and £5372 more than the sum offered. By special contracts with the railway companies one of them was supplied at 3s. per 1000 feet, and the other at 3s. 6d., and the public lights at 2s. 3d. per lamp per 100 hours, including lighting and extinguishing, each of them burning 5 feet per hour.

The great danger of dealing in any way with so highly inflammable a substance as petroleum or shale oil has been fearfully exemplified by the catastrophe on the Chester and Holyhead Railway. Railway companies ordinarily refuse to convey such dangerous commodities, and fatal experience has proved that any precautions which might have been taken to prevent the petroleum from igniting were very insufficient for safety. It is questionable whether an explosion of the same weight of gunpowder would have produced effects equally destructive, and it seems evident, from the rapidity with which the flames extended, that equal care is required against ignition in one case as in the other. It is very doubtful indeed whether even the iron-cased vans in which gunpowder is conveyed by railway would have proved sufficient protection against the ignition of the inflammable fluid in the event of such a collision.

A correspondent has forwarded to us a copy of a handbill, from which the printer's name and address have been cut, containing a false and scurrilous attack on the proprietor of this JOURNAL; and, with the view of tracing the author of the libel, and bringing him to the bar of a criminal court of justice, we shall be obliged by our friends forwarding to us any other copies they may have received, accompanied by the original bands in which they were transmitted.

Communicated Article.

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ON THE ESTIMATION OF SULPHUR IN COAL GAS.

By ALFRED G. ANDERSON, Esq.,
Professor of Practical Chemistry in the Amalgamated Queen's and Sydenham Colleges (now Queen's College), Birmingham.

(*Continued from page* 457.)

On the 7th of July last, Mr. Valentin, in a communication to this JOURNAL (No. 410, vol. xvii., page 510) and which immediately follows my paper upon the same subject published in the preceding number, makes the following remarks:—"I disagree with M. Ellissen that in Dr. Letheby's process the gas is burned under the best practical conditions for a good oxidation of the sulphur contained in the gas. People do not generally sit in their (drawing) rooms with some half dozen of Leslie's burners overhead, which burn the gas as much as possible with a short blue flame, giving little or no light, into which a copious supply of ammonia gas is made to diffuse itself." The statements of M. Ellissen upon what he, without doubt, very properly calls the "practical problem" of the sulphur determination question of coal gas—and I take his communication to this JOURNAL of the 12th of May last (No. 406, vol. xvii., pages 333 and 334) as the chief expounder of the views he now holds upon the subject—are for the most part certainly singularly unfortunate and inapplicable. I am glad to see the confirmatory observations of Mr. Valentin—a practical investigator of the subject—upon my own views in reference to the above point. Thus in my communication of the 23rd of June last, published in No. 409, vol. xvii., page 457, I had some time previously anticipated Mr. Valentin on this head by observing, in reference to the remark, *that while the practical problem remains to provide an apparatus by which all the sulphurous products during the combustion of gas in the ordinary methods in use can be completely ascertained,* "*it is easy to see that the employment of the Leslie jet in analytical methods does not fulfil* this condition." Further, I said "a *single* jet—bat's-wing or fishtail—both giving a vast increase in the sulphur over the Leslie—since everybody knows that one or other of *these is extensively used by almost all consumers of gas—most certainly should command the preference in this regard.*" What will, without doubt, be eventually insisted upon, that there may be an equitable adjustment between the gas consumers and the gas companies of this vexed sulphur question arrived at, is the adoption of some arrangement of apparatus in which such a perfect parallelism will be admitted to exist between the amount of sulphur determined by the system of testing employed, and that proportion known to be converted into injurious sulphurous compounds by the burners—no matter of what form they may be—which may be at that time in use by the consumer. And it further, happily, appears that while M. Ellissen and myself are upon one accord as to the desirability of constituting a "practical system" of coal-gas sulphur determination—that the gas consumer should be subjected to the inconvenience engendered by the production of sulphurous fumes in no higher or lower degree than that indicated by the apparatus employed for testing—it would appear that in this view we are likely to be reinforced by Mr. Valentin himself, for he says (page 511, No. 410, July 7), "I should hail with pleasure a good method for estimating the sulphur compounds in coal gas which are actually oxidized and pass into the atmosphere of our rooms under the identical conditions under which coal gas is burnt so as to produce most light." At any rate, be this as it may, the fact that the testing-burner for standard illuminating power has been defined by a committee of the House of Commons * to be that which, *while bringing forth from the gas the greatest amount of light, at the same time shall be practicable for use by the consumer,* may certainly be regarded as a precedent tending in an important way towards establishing what in my opinion should form a just basis for any future system of sulphur analysis of practical application.

It will be interesting to review as briefly as possible the position in which the sulphur determination of coal gas remains at the present time, and the various phases through which it has passed since the first discovery of bisulphide of carbon as one of the constituents of coal gas. That the late Mr. Wright, of Westminster, many years since, was the first to devise a form of apparatus by which the gas should be burned, and the products of its combustion collected, is, I believe, by gas chemists and engineers, universally admitted. It consisted of a very simple arrangement. A "single" jet of gas was employed to burn the measured bulk of gas; the products of this combustion were received inside a glass tube kept cool by a flow of cold water circulating around it when fixed firmly inside a Liebig's condenser. The condensed products, as they formed drops upon the interior of this tube, collected towards the end of the tube away from the gas-jet, and as the level of this was slightly depressed below its other extremity, as they accumulated there they were allowed to drop into a glass vessel placed beneath it to receive them. Then they were subsequently oxidized by nitric acid, and mixed with some barytic salt to obtain the sulphuric acid as sulphate of barium. Mr. Wright also suggested, as of value in fixing a greater proportion of sulphurous products, that some ammonia solution should be placed so that its vapour should be as much as possible in contact with the burning gas and the products of its combustion. Mr. Valentin, in his paper of July 7 (No. 410, vol. xvii.), refers to this circumstance, and it is, I believe, an undisputed fact that the ammonia, not only in the old system devised by Mr. Wright, but in the Letheby arrangement also, is always instrumental in increasing the condensed sulphurous products.

It is certain that while the principle of the apparatus many years afterwards described by Dr. Letheby (*Chemical News*,

* Metropolis Gas Act, 1867-68.

vol. vii., page 73) is identical with that constructed by Mr. Wright, yet that the former possesses more than one defect not found in the latter. For instance, the receiver of the Liebig's condensing vessel was kept very cool; this is by no means the case with the large glass vessel employed to collect what can be condensed upon the system of Dr. Letheby. Then, again, the products of the combustion, together with the ammoniacal fumes, by the slight depression of the cooled condensing-tube, being made, as it were, to travel down hill, are maintained longer in contact with the cooling influence of the surrounding cold, by which condensation was enhanced, by the means at command, to the highest degree. All who have had occasion to use both of these forms of apparatus could, almost at a glance, observe how unfavourably in this regard Dr. Letheby's apparatus contrasts with the late Mr. Wright's. In fact, as the experiments described at page 303, vol. xvi., No. 379, in my paper on "Defects in the Apparatus generally used for the Determination of Bisulphide of Carbon in Coal Gas, and Description of a new Apparatus for its Estimation," demonstrate, 34 per cent. of the sulphur escapes if nothing in the shape of condensers be placed beyond the large glass receiver, otherwise open to the atmosphere, so often employed; and this, too, when the pumice cylinder used to moderate the inflow of air to the interior of the trumpet-tube and receiver was compared with the U-tube receiver addition. I stated there as the result of these experiments, instituted to ascertain how much escapes through not being finally drawn through efficient condensers when emerging from the opening of the large receiver in Dr. Letheby's arrangement—

"In round numbers, consequently, the loss of sulphur through (this) non-condensation amounts, it is decidedly proved, to *thirty-four per cent., when every precaution is taken to burn the gas slowly* and steadily; to control the current of atmospheric air, in passing through the condenser, by the addition of the 'desulphurizing' vessel, and thus ensure that *every possible amount of condensable products be retained in those vessels.*"

These results are deduced from five experiments, all confirmatory of each other in a remarkable degree. Further, if we contrast the effect of checking the rapid passage of ammoniacal vapours and sulphurous products from the apparatus, by placing the broad lower end of the trumpet-tube beneath the surface of the liquid ammonia of the glass gutter of my "desulphurizing" vessel, and compare it with the same burner as usually placed under it over a bottle of ammonia (see page 819, vol. xv., No. 367), we at once see that we again obtain a vast increase of sulphurous products.

After calculating the numbers obtained upon that occasion, I proceed to observe—

"The superiority communicated to the 'Leslie' burner by enclosure in the Desulphurizer is thus proved to be a little more than *thirty-four and a half per cent. over the usually* adopted 'open'-air plan!"

Taking positive experimental demonstration, therefore, we find—

1. That if, instead of placing the "Leslie" burner over the bottle of ammonia, under the trumpet-tube, as recommended by Dr. Letheby, we screw the same jet to the inlet-pipe of the pumice vessel, which I have named the "Desulpurizer," because it is effectual in preventing any atmospheric sulphurous acid or sulphuretted hydrogen from making its way into the receivers (as described at page 617, vol. xv., No. 360), then we get *thirty-four and a half per cent. more sulphur out of the same gas.*

2. Again; if, in addition to this set of apparatus, we add several U-tubes containing some condensing fluid, such as potassa or ammonia, dragging every particle of the internal atmosphere of the trumpet-tube and glass receiver through them, we again recover 34½ per cent. more sulphur of the gas, which otherwise unmolested would have escaped into the air!

In the face of these demonstrations, let us recollect, of *pure experiment*, what becomes of M. Ellissen's most remarkable statement?—

"The condensation of the sulphur products (sulphuric and sulphurous acids) in the glass cylinder [of Dr. Letheby's arrangement] *is complete* (!), *experiments having proved that a sensibly greater amount of sulphur is not obtained by increasing the number of these vessels, nor by filling them with ammonia* (*adding ammonia to them*)"!!!

(*To be continued.*)

Register of New Patents.

2873.—Richard Canham, of Ray Street, Clerkenwell, in the co. of Middlesex, and James Thomson, of Union Road, New Wandsworth, in the co. of Surrey, for "*Improvements in stoves for consuming gas and other fuel, and in ovens to be used therewith.*" Patent dated Oct. 12, 1867.

This invention relates, first, to a novel combination and arrangement of parts of a stove for burning a mixture of gas and atmospheric air. For this purpose the stove is by preference made of a cylindrical form. In the centre of the stove are fixed two cylinders concentric with each other, and having a small space left between them; these cylinders extend from the bottom to a short distance from the top of the stove, and are surmounted by a conical cover having a hole through it. The inner cylinder is closed at top and bottom by wire gauze or perforated metal, and has a pipe therein, through perforations in which the gas issues into such cylinder and there mixes with atmospheric air, such mixture of air and gas being burnt on the top of the wire gauze or perforated metal cover of the cylinder, the flame thereof being contracted by passing through the hole in the conical cover. Atmospheric air is supplied to the flame by its passing up the space between the two inner cylinders, and is caused to impinge thereon by the conical cover. The products of combustion pass away by a pipe, one end of which is near the bottom of the stove and open thereto, whilst the upper end passes out at or near the top of the stove.

2893.—Adam Aitchison, of 11, Wilton Terrace, Peckham, in the co. of Surrey, for "*Improvements in the treatment of hydrocarbons for the production of gas sufficiently permanent to be stored for lighting and heating purposes, and especially in the treatment of the hydrocarbons and other products obtained by distilling or carbonizing coal, wood, and other carbonaceous materials, including those obtained in the manufacture of gas and in the distillation of coal tar.*" Provisional protection only obtained. Dated Oct. 15, 1867.

This invention consists in first heating the hydrocarbons and other products obtained from the distillation or carbonization of coal, wood, and other combustibles, as also other hydrocarbons, so as to convert the volatile constituents thereof into the form of vapour, and in then causing such vapours to pass in a more or less finely divided state against highly heated surfaces, whereby such vapours are converted into gases sufficiently permanent to be stored for lighting and heating purposes.

2894.—Thomas Henry Baker, engineer, and Thomas Woodroffe, builder, both of Tunbridge, in the co. of Kent, for "*Improvements in treating sewage or other liquid matters so as to purify the more fluid portions thereof, and recover some of the contained matters for re-use in manufacturing processes, and in the preparation of others for use as manures.*" Provisional protection only obtained. Dated Oct. 15, 1867.

According to this invention the sewage or other liquid matters from towns or other places, or from works where manufacturing or other processes are carried on with a tendency to render impure the sewage or other liquid matters passing therefrom, is allowed to flow into wells or receivers, of which there may be several, to be filled in succession if desired, better to meet the requirements or occasions of violent storms, or to obtain greater purification, or for other purposes. The matters passing into each of these wells or receivers rise upwards through filtering materials supported in a frame at the upper part of each of such wells or receivers, by which the watery or more fluid portion is separated therefrom, and as it rises above the filtering matter such more fluid portion may flow away by suitable conduits to a river or other watercourse, or it may be collected, if desired, for irrigation or other purposes.

2899.—Alexander Melville Clark, of 53, Chancery Lane, in the co. of Middlesex, for "*Improvements in apparatus for producing motive power by means of compressed air, water, or other liquid.*" A communication. Provisional protection only obtained. Dated Oct. 16, 1867.

The chief feature of this improved motor is that it is worked by compressed air acting on a piston in a cylinder, which, during its motion, at the same time stores and compresses a fresh quantity of air in a reservoir for feeding the working cylinder and acting on the piston.

2925.—Edward Casper, of 101, Cannon Street, in the City of London, merchant, for "*An improved mode of and means for preventing the bursting of the tubes in steam and water pressure-gauges and other tubes or pipes from the effects of cold.*" A communication. Patent dated Oct. 18, 1867.

The chief object of this invention is to prevent injury to water and steam pressure-gauges on locomotive, marine, and other steam-engines in cold weather, during periods when such engines are not working and the water in the said gauges becomes frozen. The invention consists in filling a portion of the space within the said tubes or pipes with some elastic or compressible body or substance which will yield sufficiently to prevent the rupture of the tubes by the augmentation or expansion produced in the volume of the water by the freezing of the same.

In carrying the invention into practice it is preferred to employ a small cylinder, which may consist of a solid piece of vulcanized india-rubber, cork, or other elastic substance, or may be made hollow and provided with elastic-closed ends or sides. This cylinder is made of suitable dimensions for the gauge or other receptacle in which it is to be employed, and may be placed loosely or independently therein. The elastic or compressible body is not necessarily cylindrical, but may be made of any suitable and convenient form. As the water freezes and expands a corresponding contraction or reduction of size takes place in the elastic body or cylinder, and the strain which would otherwise be occasioned upon the sides of the tube or other receptacle is entirely prevented.

2931.—Henry John Bale, of 1, Russell Terrace, Oakley Square, in the co. of Middlesex, for "*Improvements in apparatus to be used in cooking by means of gas.*" Patent dated Oct. 18, 1867.

This invention has for its object improvements in apparatus to be used in cooking by means of gas. In order that an ordinary gas-burner carried by a bracket projecting from the wall of a room or chamber may from time to time be used in cooking, an apparatus is employed consisting of a bracket so constructed as to be readily applied and secured to the wall of the room or chamber when required for use, and afterwards removed from it. This bracket carries a ring or platform to support a pot or kettle, and is jointed so that the said platform may be brought over the burner or swung to one side of it by moving about the joint in the bracket. To the wall of the room or chamber where the bracket is to be applied, and in the vicinity of

the gas-burner, are fixed two nails or studs having heads. The base plate of the bracket has holes through it of a size to allow these heads to pass, and the holes are slotted on the upper side so that when the plate of the bracket has been applied over the nails or studs it drops down or slides along so as to bring the stems of the studs or nails into the slots, and thus the plate becomes secured to the wall.

2968.—James White, of Great Portland Street, in the co. of Middlesex, for "*Improvements in means for ventilating buildings and other places.*" Patent dated Oct. 22, 1867.

This invention relates to means for withdrawing vitiated air from a room or enclosed space. For this purpose apertures are formed in the ceiling of the room or enclosed space, having suitable channels or passages communicating therewith, and with a chamber connected with the grate or fireplace employed to warm such room or enclosed space, and from such chamber a pipe or channel is carried a short distance up the flue. Thus, by the heat generated by the grate or fireplace in the chamber connected therewith, the air contained in such chamber is rarefied, and in passing off by the flue such rarefied air carries away with it the vitiated air from the room or enclosed space. The vitiated air passes through the apertures in the ceiling, and by the channels or passages into the chamber connected with the grate or fireplace, and out thereof through the pipe into the flue.

2970.—Henry William Sambidge, of Birmingham, in the co. of Warwick, manufacturer, for "*Improvements in sliding gaseliers, chandeliers, and other pendent lamps.*" Provisional protection only obtained. Dated Oct. 22, 1867.

This invention consists in dispensing with the ordinary water-joint by the substitution of a solid boss or carrier upon the outer tube, which boss or carrier is for the purpose of sustaining the balance-weight chains. Two tubes only are employed, one sliding within the other; and above the boss or carrier is fitted a gland or stuffing-box, through which the inner tube works.

2989.—George Olney, of the city of Brooklyn, state of New York, U.S.A., gas engineer, for "*Manufacturing and for improving illuminating gas.*" Provisional protection only obtained. Dated Oct. 24, 1867.

The main features of this invention are, first, the arrangement, in connexion with retorts, a cooler, and a gasometer, of carburators provided with tanks, filters, liquor-chambers, connecting-pipes, an air-pump and its connexions, an independent air-pipe, a liquor-pump with pipe, a gas-pipe, a steam-pipe, a liquor-gauge and syphon-gauges (as described in the specification), for the purpose of converting carbonihydrous and naphthene vapours with atmospheric air into illuminating gas, or for making or producing a fixed or illuminating gas from carburetted air. Second, the injecting of petroleum, or its products, into heated retorts direct, by means of a pipe, and there combining it with atmospheric air, carburetted or not, and thus chemically producing illuminating gas by passing carburetted air through heated retorts. Third, the producing of illuminating gas by combining the carburetted air, after having passed through the heated retorts (or within the same), with ordinary coal or oil gas. Fourth, the employment of an oil or equivalent seal as and for the purpose explained.

2998.—Robert Weare, of Compton, in the co. of Stafford, manufacturer, for "*Improvements in and in apparatus for the treatment and for the reception of urine and fæcal matter.*" Patent dated Oct. 24, 1867.

This invention consists in the employment for the reception and treatment of urine and fœcal matter of a vessel, by preference of a cylindrical form, and closed at the top and bottom. Within this vessel is an inner lining—it may be conveniently of perforated zinc; the sides of the vessel are thus double, and the space enclosed is packed full of powdered charcoal and dry earth or other deodorizing powder. The soil-pipe from an ordinary closet-pan is connected with the top of the vessel, so that the urine and fœcal matter from the pan are discharged into the interior of the vessel. The more fluid matters then filter through the deodorizing material into channels which are formed for it against the outer sides of the vessel, and which are perforated, and these channels lead the fluid matters to a small pipe connected with the bottom of the vessel and with a drain.

3004.—Henry Wilson, of Stockton-on-Tees, in the co. of Durham, for "*Improvements in cocks or valves for discharging water, oil, and other fluids or gases.*" Provisional protection only obtained. Dated Oct. 25, 1867.

According to this invention the barrel of the cock is formed with a valve-seating inside, through the centre of which a spindle passes, on which two valves are fixed at any suitable distance apart, one above and one below the valve-seating. Under the bottom valve is fixed a spring which rests upon the bottom of the cock and presses against the valve above, thereby keeping it against the seating. On the top of the upper valve rests a flat disc, on the upper surface of which ridges or teeth are formed, which fit into corresponding ridges or teeth formed upon a similar disc fixed to the spindle by which the valve or cock is opened. Then by moving the spindle of the valve or cock either to the right or left, the valve is freed off the seating by the discs, at the same time compressing the spring. As soon as the spindle is released, the spring closes the valve.

3014.—George Dorsett, Edward Dorsett, and John Bennington Blythe, all of London Street, in the City of London, merchants, for "*Improvements in the mode of and apparatus for burning the gases arising from the distillation of liquid hydrocarbons, and also in economizing fuel by the said process.*" Patent dated Oct. 26, 1867.

According to one portion of this invention, the gases produced by the distillation, by heat, of liquid hydrocarbons, such as coal tar, creosote, coal, and shale oil, petroleum, and other matters of a like nature, are burnt in the following manner:—The gas produced from the matter under distillation (such as coal tar, at that stage of the process in which the heavy oil has commenced to run from the worm) is caused to pass through a pipe commencing at the top of the boiler, generator, or retort, and terminating in the ashpit or furnace. It is there burned either by allowing it to pass through the fire, on the grate-bars, or through a burner formed with a series of holes, or upon a diaphragm, as in the case of the ordinary gas-burners used for cooking. This part of the process is particularly adapted for application under tar and petroleum stills.

3027.—William Payne and Alexander Black Fraser, both of Liverpool, in the co. of Lancaster, general founders and ships ironmongers, for "*Improvements applicable to ships and other pumps.*" Patent dated Oct. 28, 1867.

This invention consists in certain improvements applicable to ships and other lift-pumps, the heads of the suction-pipe or pipes of which open into an enclosed chamber, and the working barrel of which extends down through the top of the enclosed chamber to near the bottom of the vessel, at one side of the suction-pipe or pipes, and also consists in dividing the chamber between the suction-pipe or pipes when one or more suction-pipes are connected therewith by a vertical diaphragm, the lower portion of which is solid to a point above the lower valve in the working barrel, and above this it is perforated or formed into a grating, through which the water from the suction-pipe passes to the working barrel. The object in making the lower portion of the vertical diaphragm solid is to prevent the pump losing its water, thus obviating the necessity of "priming," and the grating of the vertical diaphragm is used to prevent chips or other foreign matters passing into the working barrel and choking the valves. The invention further consists in the use or application of a short open-ended cylinder, which may be screwed to one or both ends, and which cylinder is screwed in, or fastened on, to the head of the suction-pipe or pipes entering the enclosed chamber.

3032.—John Young, of Aspull, in the co. of Lancaster, for "*Improvements in the application of cannel coal 'slack' to the manufacture of gas and coke.*" Patent dated Oct. 28, 1867.

The invention consists, first, in crushing the cannel coal slack by suitable machinery into such sized pieces as shall destroy the cohesion of the pyrites and carbonate of lime adhering to the crystals of the coal, and subsequently washing the crushed slack in any suitable ordinary and well-known machine, which is so arranged in its parts and motions that it separates the impurities from the coal and all other matters having a greater density than the coal itself. Secondly, in drying and warming the purified slack and mixing it with any hydrocarbon pitch containing paraffin, naphthaline, or other constituents which are convertible into illuminating gas and only fusible at a high temperature, and then forming the mixture into blocks by pressing it into moulds by suitable well-known machinery. By the mixture employed the quantity and quality of gas-yielding properties of the cannel are enhanced, and further, the blocks so formed are rendered impervious to air and moisture, and therefore protected from the deteriorating influence to which coal is subject when long kept in store, and by removing the sulphur and lime from the coal, the manufactured gas is much easier of purification, and the quality of the coke is also improved by abstracting the elements forming the ash and clinker.

3041.—William Robert Lake, of 8, Southampton Buildings, Chancery Lane, in the co. of Middlesex, consulting engineer, for "*Improvements in centrifugal machines for separating liquid from solid matter.*" A communication. (Complete specification.) Patent dated Oct. 28, 1867.

This invention, in the first place, relates to the method of and means for avoiding or overcoming the injurious effects which are caused by the irregular or unequal distribution of the material to be operated upon within the cylinders or baskets of centrifugal machines while the same are rotating with great velocity. This result is attained by so suspending the said cylinder or basket that the revolving mass will most readily and certainly approximate an axis of revolution *in equilibrio*, and will therefore communicate the least practicable amount of injurious motion or vibration to the fixed parts of the mechanism, and to the structure on which it is suspended. The plan for suspending the cylinder or basket consists in the use of a flexible elastic bearing or connexion on which the rotating parts of the machine and the contents are carried. This bearing is so applied as to allow the cylinder to revolve eccentrically so far as is necessary to permit it to find an axis of revolution *in equilibrio*, even when the weight of the material to be acted upon is not equally distributed in the cylinder, while at the same time the elasticity of the bearing itself, or of other equivalent spring connexion, is so applied that in aid of and in addition to the force of gravity it will exert a restraining force, which increases as the eccentricity of movement of the cylinder increases, and tends to control or prevent any unnecessary and injurious gyration of the revolving parts.

This invention relates, in the second place, to the construction of the bearing by which the cylinder and its attachments are suspended, so as to permit and ensure the action of the centrifugal machine before mentioned.

This invention relates, in the third place, to the construction of the cylinder, whereby the contents of the same may be more readily discharged than by the method usually employed, and consists in forming openings in the bottom of the said cylinder around the shaft, which openings are closed by a valve or cover.

3047.—William Bishop, engineer, and Benjamin Burningham, builder, both of Pratt Street, Camden Town, in the co. of Middlesex, for "*Improvements in apparatus for preventing effluvia entering tanks or cisterns from the waste-pipe.*" Patent dated Oct. 29, 1867.

This invention relates to a means of preventing the admission of effluvia from drains entering cisterns by the waste-pipe, as is commonly the case, and consists in the application of a lift-valve fitting in a socket let into the bottom of the cistern or tank, which socket communicates with a pipe for carrying away the surplus water to

the closet or drain. The valve-stem passes up through a bridge-piece and guide attached to the socket, a tube being fixed on the neck of this guide, supporting a float at the height to which the water is to rise. This float is connected to the valve-stem by means of a rod or chain passing down through the said tube, the length of the rod or chain being regulated as desired by means of a nut and screw passing through the float.

3050.—Loftus Perkins, of 6, Seaford Street, Gray's Inn Road, engineer, for "*Improvements in water and other meters, and in engines for obtaining motive power.*" Patent dated Oct. 29, 1867.

According to this invention the use of tappets or cams acted on by the piston or piston-rod is dispensed with, and the admission of steam or fluid to the cylinders which work the valve or valves of the engine or meter, or it might be the putting these cylinders in communication with the exhaust, is governed by a valve moving reciprocally with the piston of the engine—that is, that it shall both commence and end its stroke simultaneously therewith; it may either be that the piston itself is made to form the valve, or an independent valve making an equal stroke with the piston, or a stroke of any other desired length may be employed.

3055.—Joseph Beverley Fenby, of Birmingham, in the co. of Warwick, mechanical engineer, for "*Improvements in valves for hydraulic presses and for other purposes.*" Patent dated Oct. 30, 1867.

This invention consists in constructing the valves of a hollow cylinder and piston and plunger working therein, the said hollow cylinder and piston or plunger and parts connected therewith being constructed and arranged substantially as described, whether the valve be worked by the direct motion of the piston or plunger or by a small supplementary valve of similar construction.

3060.—Alfred Vincent Newton, of 66, Chancery Lane, in the co. of Middlesex, mechanical draughtsman, for "*Improvements in the ventilation of buildings, ships, and carriages.*" A communication. Patent dated Oct. 30, 1867.

This invention relates to a mode of supplying fresh air to apartments, and to compartments of carriages, and withdrawing or discharging the vitiated air therefrom without producing draughts. In applying the invention to buildings—say, for example, to a hospital, which requires specially good ventilation—the internal walls are built hollow—that is, with vertical air-passages in them. The portion of the wall between the air-passages and the chamber or ward to be ventilated is built of bricks pierced with holes, which, as the bricks are laid, form small horizontal air-channels for the air supplied to the vertical air-passages. The passages are divided horizontally, at a height of, say, 5 or 6 feet from the floor, and distinct air-flues connect with the upper and lower divisions thus formed, the larger or upper division being used for supplying cold, and the smaller and lower division for supplying heated air to the ward or chamber. The wall is faced with porous cement, which allows the air at a pressure to percolate through, in minutely divided streams, into the chamber, after the manner of tent ventilation. The roof of the chamber is also porous, and it forms between the girders, which may be of iron, air-exhaust flues. Below the floor of the chamber or ward above are also air-flues, separated from the lower flues by substantial laths enveloped with some material that is a good non-conductor of sound. These flues are connected with vertical exhaust-flues built in the walls, and connected with a chimney-shaft, or an exhaust-fan, to quicken the withdrawal of the vitiated air.

3062.—Robert Clegg, of Islington, in the co. of Middlesex, engineer. for "*Improvements in the construction of pumps.*" Patent dated Oct. 31, 1867.

This invention consists in the employment of a cam or eccentric wheel working on an axis within a cage or frame in the interior of the body of the pump. At the lower or bottom end of this cage or frame is the piston. One revolution of the axis causes the piston to be raised and lowered three times. The cam or eccentric wheel has three projecting points, which press against small friction rollers at the top and bottom of the cage or frame, thus causing the piston to be raised or lowered for the suction and delivery of water or other liquid. The axis passes through the body of the pump, to one end of which is attached a crank and handle.

3084.—John Scott, of 20, Westmoreland Place, City Road, in the co. of Middlesex, mechanical draughtsman, for "*Improvements in shades for gas and other lamps, and in the mode of fitting or applying the same.*" Provisional protection only obtained. Dated Nov. 2, 1867.

This invention relates to a peculiar construction of shades for gas and other lamps, and to the mode of fitting and applying the same to such lamps, the object being to obtain a continuous rotatory motion of the shade, so long as the light enclosed is burning, whereby an excellent medium is obtained for the display of advertisements and business announcements of all kinds, or for showing a succession of ornamental designs, views, or other devices, which are to be printed or otherwise produced on, or attached to, the surface of such revolving shades. In carrying out this invention it is proposed to manufacture a shade of any desired shape or configuration, and of any suitable material, whether opaque, transparent, or semi-transparent, or translucent, and to fit or mount into the upper end of such shade a ventilator or horizontal fan, composed of a number of inclined blades of metal, &c., or in lieu thereof an Archimedean screw or spiral blade may be used. Through the centre of such fan or spiral there is passed a pin or vertical pivot, upon or round which the shade is caused to revolve by the action of the ascending current of hot air from the flame upon the inclined blade or spiral. This pivot or centre is carried by a tripod or other conveniently shaped metal clip, which is made to fit the upper rim of the chimney or globe of the lamp.

3105.—Joshua Kidd, of Paul's Wharf, in the City of London, gas engineer, for "*Improvements in obtaining artificial light, and in the apparatus employed therein.*" Provisional protection only obtained. Dated Nov. 4, 1867.

This invention consists in producing a mixture of atmospheric air or air and coal gas combined with the heated vapour of non-volatile heavy hydrocarbons, and in burning such mixture for the purpose of obtaining light therefrom. It is found that by mixing air and gas with the heated vapours of heavy oils in suitable vessels, and in burning the same through properly constructed burners, the mixture above referred to may with great economy be used for lighting purposes, and if desired, when the oil-vessel is raised to the proper temperature, atmospheric air alone mixed with the vapour may be used, as in burning it gives a bright and cheap light much superior to common coal gas.

In carrying out this invention, a burner, preferably a circular one, formed with a number of round or other shaped escaping apertures similar to an Argand burner inverted, is attached to the lower end of a pipe suspended from a carburetting oil-vessel, so constructed as that the heat from the light shall not volatilize the oil. The apertures in the burner must be made much larger than those required for burning coal gas alone. The holes may be so arranged in the burner as to allow the mixed vapour to escape horizontally, but it is preferred that they be so arranged as to incline or force the escaping vapour downwards. By this arrangement the mixed vapour burns more steadily and with less tendency to be blown out or smoke than when the flame is upright. The heavy vapour mixed with air gives out less heat in burning than when mixed with coal gas; on this account the burners must be much larger, and be placed much nearer to the oil-vessel than when the apparatus is used for curburetting gas alone. Where gas can be conveniently obtained, it is preferred to use it mixed with the air, and in order to raise the oil to the required temperature, the mixture of gas and air should be regulated when ignited as to burn with a blue flame; after the vapour begins to generate in the oil-vessel the particles of carbon are heated to a state of incandescence in the blue flame giving out great illuminating power. The large escaping apertures in the burners serve as a safety-valve, in case the mixed air and gas should be drawn into the oil-vessel and explode, but to prevent this wire gauze may be placed in the before-mentioned pipe attached to the burner.

The hydrocarbons most suitable for the purpose of this invention are the heavy oil of tar, creosote, naphthaline, heavy petroleum, anthacene, paraffin, para-naphthaline, and other non-volatile oils which are useless for ordinary illuminating purposes.

3110.—Herbert Allman, of Ampthill Square, in the co. of Middlesex, civil engineer, and Frederic Newton Gisborne, of 445, West Strand, in the said co., civil engineer and electrician, for "*Increasing the production of light from and improving the combustion of carburetted gases.*" Patent dated Nov. 5, 1867.

This invention consists in improved apparatus which is applied to the chimney or shade of a lamp for the purpose of regulating by the action of a valve the admission and distribution of the atmospheric air supplied to the flame of the ignited gas; the gas burned in the lamp may be coal or other carburetted gas, or a gas generated by the combustion of oil, paraffin, or other liquids ordinarily used for lighting purposes. It is found that the object is best effected by employing a valve that is made moveable, by means of a bar, joined on to the valve, composed of two metals of different expansibility, so that the heat of the ignited gas causes the bar to bend or curve and thus open the valve, and the admission of air is thus regulated.

3155.—Joseph Wontner Smith, of 20, Tenter Street, engineer, and Tony Petitjean, of 26, John Street West, chemist, both in the co. of Middlesex, for "*Improvements in warming, ventilating, and heating apparatus.*" Provisional protection refused. Petition dated Nov. 8, 1867.

A room or chamber is first established in the basement or any other convenient place having a communication with the external air, and above this room or chamber is erected a brick furnace or iron stove with a wrought or cast iron boiler, which is kept filled with fuel and fed through openings in the top or on the side. This portion of the apparatus is called a "gas heating producer;" it supplies every part of the building with gas fuel, which is conveyed through brick flues, or earthenware or metal pipes. The boiler is double jacketed to hold water when required. The amount of heat developed during the formation of the gaseous fuel is much more than is necessary for its production, and it follows that all the excess of heat may be applied to decompose a corresponding weight of water and to rearrange it as hydrogen and carbonic oxide, which gives a greater heating power to the gaseous fuel. In this process a great saving of fuel is effected; smoke is done away with, and cleanliness insured by the absence of dust from ashes and soot. The water surrounding the sides of the gas producer, besides being used for all domestic as well as manufacturing purposes, is also available for establishing a circulation of hot water through pipes to any part of the building where open fires are not desired. The open fires are made to effect the perfect combustion of the gaseous fuel by means of a peculiar arrangement of several ranges or rows of gas-jets on the "Bunsen burner" principle. The fire-grates are filled with pieces of fire-brick, pumice-stone, or any incombustible material, and the mingling in proper proportion of air and gas fuel in burning through these pieces of bricks or stones makes them red hot, and produces flame which gives the cheerful look so much appreciated. A very good ventilation can be obtained by a current of hot air established in the underground room where the gas producer is placed, and the warm air may be made to circulate to any part desired. The waste heat of the open grate or fireplace may be made use of to complete the system of ventilation by causing a rapid evacuation of the impure air.

3158.—Sibbit Landells, of 33, High Street, Gateshead, in the co. of Durham, for "*Improvements in the manufacture of glass globes and other hollow forms for gaseliers, chandeliers, candles, lamps, and*

other similar purposes." Provisional protection only obtained. Dated Nov. 8, 1867.

In the manufacture of glass globes, moons, and other hollow forms for chandeliers, lamps, and other similar purposes, it is proposed to blow the article into a suitable mould, not formed exactly after the ultimate form the article will assume when finished, but with such additions as may clearly mark and define the size and position of the two holes, one at the top for the escape of heated air and gases, and the other at the bottom for connexion with the gallery or glass holder attached to the lamp, in order that, with the least possible labour, these holes may be accurately and rapidly formed.

3171.—Mark Rollason, of Birmingham, in the co. of Warwick, modeller, for "*Improvements in suspended gas-lamps.*" Patent dated Nov. 9, 1867.

This invention has reference to suspended gas-lamps, such as are ordinarily used for halls and vestibules, and consists of the following arrangement or combination of parts for raising and lowering the lower part of the gas-shade or globe surrounding the burner for the purpose of facilitating the lighting of the lamp:—In the axis of the metal ring by which the upper part of the globe or shade is supported a tube is fixed, the lower end of the tube being by preference about the level of the gas-jets which are situated on either side of it. The said tube is supported by a cross-arm carried by the metal ring. The lower part of the globe or shade has a rod or tube fixed in its axis, which rod or tube is of a size proper to slide in the tube fixed in the axis of the ring carrying the upper part of the globe or shade. This sliding rod or tube, carrying the lower part of the globe or shade, is connected with the fixed tube by a stud which engages in a slot therein; the top of this slot is turned at right angles, and constitutes with the said stud a fastening similar to a bayonet joint. Besides the said stud the sliding rod or tube is provided with a flat spring on one or on opposite sides, which spring or springs, by pressure against the inside of the fixed tube, produce sufficient friction to preserve the said sliding rod in any position in the fixed tube to which it may be brought. In order to raise the lower part of the globe or shade, it is pushed upwards by a knob at its under side, when its rod slides up the fixed tube. By now turning the knob through a small angle, the said lower part of the globe or shade is fixed in its raised position. Instead of using the springs described, the sliding rod or tube may be made to pass through a stuffing-box, and the required friction to support the lower part of the globe or shade be thereby produced. In order to depress the lower part of the globe or shade, for lighting the lamp or other purpose, the knob is turned in a direction proper to liberate the sliding rod, and permit it to slide in the fixed tube. The said lower part of the globe or shade may now be depressed to the required extent. The said lower part of the globe or shade will remain at any height to which it may be brought, by the action of the springs or stuffing-box described.

3172.—Thomas Wells Ingram, of Birmingham, in the co. of Warwick, manufacturer, and Edward Curtis Kemp, of Birmingham aforesaid, manufacturer, for "*Improvements in gas-lamps.*" Patent dated Nov. 9, 1867.

This invention consists of the improvements hereinafter described in gas-lamps, which improvements are particularly applicable to lamps employed for halls and vestibules, but are also applicable to lamps for other purposes.

The invention consists, firstly, of the following improvement in raising and lowering the bottom or lower part of the shade or globe of suspended lamps for the purpose of lighting the gas. Instead of supporting the said lower half or part of the globe or shade by means of exposed chains connected with a counterbalance weight, the said chains are caused to work in a frame of tubes, by which, when the lower part of the shade or globe is raised, the said chains are in great part concealed and protected. The motion of the lower part of the shade or globe is made very steady by the said frame of tubes guiding the suspending chains.

The invention consists, secondly, in suspending the globe or shade of suspended lamps in the following manner:—The globe or shade is made in one piece, instead of being divided at its middle as is usual, and in the sides of the globe a series of three or other number of holes is made. The lower ends of the suspending rods are turned at right angles into a hook-like form, and by being passed through the holes in the shade or globe suspend it in its place; one of the said rods conducts the gas to the burner, or the globe may be provided with hooks which take into eyes in the ends of the suspending rods.

The invention consists, thirdly, of the following improvements in the smoke-condensers, or smoke-tops, commonly supported over the globe or shade of gas-lamps:—The said smoke-condensers are made of glass, and by preference the required shape is given by moulding. The smoke-condenser is supported by a metal rod screwed at its lower end or its entire length, the screwed end taking into a screw-collar in the centre of a tripod resting on the top of the shade or globe. By means of the said tripod the smoke-condenser can be fitted to shades or globes having different sized openings at top, and by the rising and falling motion of the supporting screw the condenser can be raised and lowered and the draught through the lamp regulated. Smoke-tops of terra-cotta may be raised and lowered by the same means.

3179.—William Payne, of Birmingham, in the co. of Warwick, engine-fitter, for "*Improvements in clack and bucket door pieces for pumps.*" Patent dated Nov. 11, 1867.

These improvements consist principally in casting on or attaching to each side of the opening of the clack or bucket door piece grooves, into which the door may slide, giving such a slope or inclination to the inside face of the grove and the outside of the door, which fits against it, as shall have the effect, when the door is let down, of causing it to press against the face of the clack or bucket door piece, so as to make a tight joint, and in the manner of making a more perfect joint, in case of need, by using set screws, or by inserting in the groove in the inner face of the door cork, india-rubber, wood, or some more elastic substance than iron.

3219.—Alfred Vincent Newton, of 66, Chancery Lane, in the co. of Middlesex, mechanical draughtsman, for "*Improvements in rotary engines applicable as motors, pumps, meters, and for other purposes; also in indicators applicable to such and other engines or meters, and other purposes.*" A communication. Patent dated Nov. 13, 1867.

The object of the first part of this invention is the construction of a rotary engine or device applicable, among other purposes, as a motor, pump, or meter, which, while of a simple character and free in its movement, is comparatively tight or close against leakage, and readily accommodates itself to inequalities of temperature, as affecting the fit of the revolving slides or pistons, and their attachments, with which it is provided. This part of the invention consists of or includes two cylinders, one within and eccentric to the other, and sliding pistons arranged radially to the inner cylinder, and connected together in a free or loose manner by links to or through the intervention of a loose rivet or pin that forms the centre of motion around which the said pistons with the inner cylinder revolve. By this mode of construction an interior fixed crank-pin or eccentric is dispensed with, and the working parts or pistons, with their connexions, are left more free to work close and to accommodate themselves to the various conditions incident to expansion and contraction from the changes of temperature. In some cases, however, the said rivet or pin may be stationary and fast to the head of the outer cylinder, with the interior of which it is concentric.

The second part of the invention consists in a similar arrangement of cylinders, with radially sliding pistons and links, connecting them in a free or loose manner with a central rivet or pin, but combines with the same a close chamber arrangement for the sliding pistons within the inner cylinder, and sliding rods connecting the pistons with the links, as aforesaid, for the more effectual prevention of leakage when working the engine with an aëriform fluid. These two divisions of the invention also include or have combined with them revolving heads or end discs to the revolving cylinder with its pistons, the one of which heads may be removeable, and the one of which may be left open at its centre, to facilitate adjustment, repair, and oiling of the interior parts.

The remaining portion of the invention consists in a novel construction of indicator or registering apparatus applicable to engines or devices contracted as described in the first part of the invention, and which is also applicable to other engines or meters, and for other purposes where quantities or measures of various kinds are required to be recorded. According to this part of the invention, a series of ratchet-wheels is disposed one above or in advance of the other, about or around the same axial line, and an actuating lever is operated at intervals by the engine or meter, and separate or independent pawls to effect the movement of the said wheels, which have pointers connected with them for traverse over a graduated dial-plate, and which wheels, or second, and after a series of them, are moved for a given distance by a stud or pin attached to the preceding wheel, and operating the ratchet that gives motion to the next wheel in succession, by which combination a compact and simple, yet correct, indicator of measures or quantities is secured.

3225.—Richard Harrison, of 7, Sackville Place, in the city of Dublin, brassfounder, for "*Improvements in cocks or taps.*" Patent dated Nov. 14, 1867.

This invention relates to certain improvements in cocks or taps, suitable either for high-pressure water-taps, or cocks for steam, air, or gases under pressure, the object being to obtain an efficient steam or fluid tight cock or tap without the use of a stuffing-box or packing, as hitherto required for that purpose. The thoroughfare through the cock is closed by means of a valve resting upon a horizontal valve-seat, with a packing or facing of leather, in some cases applied either to the face of the valve or to its seat; or the valve may be conical, and fit a conical valve-seat, in which case all packing will be dispensed with. This valve is opened and closed by means of a screw-spindle, which is either carried by the valve, and works inside a female screw made in a conical cap rotated by the usual "crutch," or by a removeable key if preferred; or the screw-spindle may engage with a female screw made in the centre of the valve itself, in which case the crutch for turning the screw-spindle is fitted directly thereon, and a conical portion or enlargement is formed on the upper part of the spindle, which is caused to fit accurately into the chamber of the tap or cock, which is also tapered or made conical to correspond to the said enlargement. The accurate fitting together of these two conical surfaces prevents any leakage from the cock, and obviates the necessity for the usual stuffing-box or packing. The valve itself is prevented from rotating whilst under the action of the female or male screw, by having a square or other suitably shaped guiding-stem formed on its under side, which engages into a corresponding chamber or recess in a hollow cup, which closes the lower part of the body of the tap or cock.

3228.—Levi Alfred Wainman, of Leeds, in the co. of York, engineer, for "*Improved apparatus for raising water.*" Patent dated Nov. 14, 1867.

The chief objects of this invention are to raise water from mines or wells, or to force water to a great height from a reservoir or water run for driving a water-wheel, or other purposes. The apparatus can either be worked immersed in the water at the bottom of a mine or well to the depth of the receivers, or out of the water, as may be most convenient. In the latter case the receivers will be fixed as near down to the water as convenient, and the suction-pipes carried down into the water. The apparatus is intended to be used with an atmosphere of steam or air admitted to the receivers at any required pressure, which will, of course, entirely depend upon the distance the water has to be forced.

3237.—William Edward Gedge, of the firm of John Gedge and Son, of 11, Wellington Street, Strand, in the co. of Middlesex, patent agent, for "*An improved gas-engine.*" A communication. Provisional protection only obtained. Dated Nov. 15, 1867.

The principle upon which this engine is based consists in the condensation or cooling of the burnt gases after their action on the driving piston. The object of this condensation is to produce the vacuum behind the piston by the contraction of the burnt gases. This condensation takes place in a condenser, either by means of an injection of cold water, by surfaces cooled by a current of water, or by any other agent capable of producing cold. This engine may be of single or double action, with two or more cylinders, according to the work to be done. It is single acting when the introduction of the gaseous mixture takes place only on one side of the piston, in which case the atmospheric pressure reacts on the other side of the piston; the engine is double acting when the introduction of the gaseous mixture takes place alternately on each side of the piston. The distributing-vessels are placed vertically at the extremity of each cylinder, and are set in movement by levers in connexion with the horizontal shaft of the engine; they comprise a mixed gas-chamber, an air reception-chamber, a firing-chamber, and an escape-chamber, all provided with two orifices, each communicating at the proper time with the cylinder of the engine. A pipe communicating with the escape-chamber conducts the gases issuing from the cylinder to the condenser, where the contraction of these gases takes place. The condenser is provided with an air-pump exhausting the gases contained in the condenser, and by means of a valve forcing them into the atmosphere.

3245.—Richard Howson, of Middlesborough-on-Tees, in the co. of York, engineer, for "*An improved gas-furnace.*" Patent dated Nov. 15, 1867.

According to this invention the furnace is constructed with a hollow hearth, somewhat like that of an ordinary reverberatory furnace, with one or more flues leading to a chimney. In the corner of the furnace immediately over the hearth is placed a pipe or casing by means of which the gas is introduced through one or more perforations opening downwards, and in the same casing is placed one or more nozzles through which air is blown under pressure through the aforesaid perforations. The effect of this arrangement is that each jet of air causes an induced current of gas to be projected downwards upon the material lying in the hearth, while the air is at the same time intimately mixed with the gas, so that the result is the production of an intense heat in the chamber of the furnace.

3304.—Ebenezer William Hughes, of Queen Square, Westminster, for "*Improvements in rotary engines and pumps.*" Provisional protection only obtained. Dated Nov. 21, 1867.

In constructing rotary engines and pumps a ring is formed, which in section is a rectangular trough, having the open side inwards or towards the centre. Within this ring a drum is fitted, so that its periphery closes the annular trough. The drum is mounted on an axis so as to be able to rotate. In order that the joints between the two parts may be tight the drum has flanges on either side overlapping the edge of the trough, in each of which a groove is turned, and the flange overlapping it has a corresponding groove in it. Into one of these grooves a round packing-ring of vulcanized india-rubber is fitted, and it is covered with a thin annular plate of steel or other metal. Into the other groove a metal ring is fixed, which projects so as to bear upon the thin plate, and the elasticity of the india-rubber maintains a close contact between the surfaces, or both of the grooves may contain elastic packing-rings covered as above described, and holding the metal ring freely between them. When steam is used in the engine metallic springs are substitued for the vulcanized india-rubber rings. The thin annular plates are roughened on the under-side, so that they may not turn on the india-rubber packing-rings. The drum has upon it a piston or stop, which accurately fits the annular trough, and closes it so that steam or fluid cannot pass into the trough from one side of the piston or stop to the other. The annular trough also has two or other number of accurately fitting stops in its circumference. They slide in and out, to allow the piston or stop on the drum to pass. The axis of the drum is hollow, and the inlet-passage for the water or fluid is at one end of it, and the outlet at the other. These passages are continued through an arm of the drum to the periphery, where they open into the annular space close to the piston or stop which the drum carries, and one on either side of it. If the steam or fluid under pressure be supplied at the inlet, it enters the annular space on one side of the piston or stop on the drum; and its pressure acting on this side, whilst it is shut off by the sliding stop in the annular trough from acting on the other side, causes the rotation of the drum. The steam or fluid in advance of the piston or stop on the drum escapes by the outlet-passage, or conversely, if the fluid is not under pressure, and the drum is driven, a vacuum is formed, and the fluid is drawn in at the inlet-passage, and expelled at the outlet.

3305.—Henry James and Edward Drewett, of Weybridge, in the co. of Surrey, for "*Improvements in water-closets.*" Patent dated Nov. 21, 1867.

In water-closets as at present constructed the pan is necessarily open at the top when the valve at the bottom of the pan is opened, and consequently an escape of foul air results from the opening of the valve. According to this invention the handle by which the valve of the pan is opened is arranged at one side of the closet, so that it can be acted upon when the flap or lid which closes the pan is shut down air-tight, so as to prevent the escape of any foul gases. In order that the flap or lid may close perfectly air-tight, an india-rubber seating is provided. Immediately under the seat of the closet, and fitting closely to it and around the pan, is arranged a trough for containing disinfecting material, which at once deodorizes any gases which may issue from the pan at the opening of the valve. This trough, which, when the flap or lid is shut, forms an enclosed chamber, is ventilated by means of outlet and inlet air-pipes, one or both of which may be fitted with valves in connexion with the flap or lid, so that when the flap or lid is open and the closet in use, the air-pipe or pipes may be closed; but when the flap or lid is shut down the air-valve or valves are open to ensure the thorough ventilation of the enclosed chamber around the pan.

3361.—James Sutcliffe Smith, of Bacup, in the co. of Lancaster, manufacturer, for "*Certain improvements in apparatus for ventilating buildings and other similar purposes.*" Patent dated Nov. 27, 1867.

These improvements consist in the use and application of a cap, cover, plate, or equivalent, for opening and closing the upper end of air-shafts used as ventilators, for the purpose of excluding dust, dirt, and extraneous matters, irrespective of the form thereof, or of the mechanical means employed to effect their rise or fall, and in the general construction, arrangement, and combination of the apparatus for the purpose as described.

3369.—Matthew Henry Larmuth and Luke Hamilton Larmuth, of the firm of Thomas Larmuth and Co., of Salford, in the co. of Lancaster, engineers, for "*Improvements in water-meters and water-power engines.*" Provisional protection only obtained. Dated Nov. 28, 1867.

This invention relates generally to those water-meters and water-power engines which have reciprocating pistons, and, in the first place, more particularly to those meters or engines having pistons the movements of which are controlled by rotating shafts through cranks, or their equivalents. The object of this portion of the improvements is to give a certain amount of elasticity to the piston, or to each end of the cylinder, or to parts in connexion with each end of the cylinder. This may be effected by forming a portion of the surface of the piston of caoutchouc, or other suitable flexible material. The water acts on the flexible material from either side of the piston, or the said flexible material may be fitted to the ends of the cylinder, or be connected therewith, the water having access in all cases to the flexible material, which is at liberty to yield to a certain extent in either direction, so as temporarily to increase or diminish the capacity of the cylinder, or the portion of the cylinder contained between the piston and either end of the cylinder. The second portion of the invention consists in fitting the cylinders of water-meters with linings of glass, earthenware, pottery-ware, porcelain, or other similar material, or with metallic lining, glazed, enamelled, or coated with a vitrified substance, or with vitrified substances.

APPLICATIONS FOR LETTERS PATENT.

2563.—Benjamin Pryor Stockman, of 23, Abingdon Street, Westminster, in the co. of Middlesex, civil engineer, for "*Improvements in water-meters.*" Aug. 17, 1868.

2585.—Julius Neumann, of 2, Bedford Street, Bedford Square, London, merchant, at present residing at 4, Sibour Street, Paris, in the empire of France, for "*Improvements in apparatus for generating and purifying coal lighting gas, the said apparatus being adapted to household or domestic use, the gasholder automatically regulated, and the surplus gas produced used as fuel.*" Aug. 19, 1868.

2598.—Alexander Rollason, of Commercial Road, chemist, for "*Improvements in purifying coal gas and obtaining ammonia from coal-gas products.*" Aug. 20, 1868.

2608.—Thomas Webster Rammell, of 3, Westminster Chambers, Westminster, in the co. of Middlesex, civil engineer, for "*Improvements in rotary or centrifugal machines for acting upon air, water, and other fluids, and communicating motive power thereby.*" Aug. 21, 1868.

2637.—Carl Johann Reinhart Jahns, of Liverpool, in the co. of Lancaster, for "*Improvements in apparatus for obtaining motive power, and for registering the quantity or quantities of steam, water, or other liquid gases or vapours, and for pumping purposes.*" Aug. 25, 1868.

GRANTS OF PROVISIONAL PROTECTION.

2266.—William Berry, of 10, Kingsland Green, in the co. of Middlesex, for "*Improvements in the means or apparatus for lighting shops, rooms, and other places from the outside of the building, by gas, oil, or other illuminating materials.*" July 18, 1868.

2426.—Charles Geoghegan, of the city of Dublin, for "*Improvements in self-acting regulators, and in the cocks or taps to the same, for supplying fluids at high pressure, and preventing the bursting of cocks, pipes, or taps under ordinary circumstances, or from the effects of frost.*" Aug. 1, 1868.

2457.—Edmund Edwards, of 22, Buckingham Street, Adelphi, in the city of Westminster, civil engineer, for "*Improvements in pumps.*" Aug. 6, 1868.

2481.—John Broadfoot, of Glasgow, in the co. of Lanark, N.B., plumber and brassfounder, for "*Improvements in water-closets.*" Aug. 8, 1868.

2487.—Daniel Nickols, of the city of Manchester, in the co. of Lancaster, engineer, for "*Improvements in cocks or taps.*" Aug. 8, 1868.

2496.—Walter Watson Hughes, of 48, Porchester Terrace, in the co. of Middlesex, for "*Improvements in fans or apparatus for forcing or drawing air.*" Aug. 10, 1868.

2512.—John Winsborrow, of 10, Livermere Place, Livermere Road, Dalston, in the co. of Middlesex, for "*Improvements in apparatus for measuring water and other liquids, which improvements are also applicable in obtaining motive power.*" Aug. 12, 1868.

2513.—John Tomlinson Pendlebury, of Bury, in the co. of Lancaster, machinist, and Thomas Pendlebury, of the same place, foreman, for "*An improved valve-motion, applicable to direct-action steam-pumps and similar purposes.*" Aug. 12, 1868.

NOTICES TO PROCEED.

1201.—Robert Alfred Wright, of Homerton, in the co. of Middlesex, engineer, for "*Improvements in heating structures and articles, and in the mode of and apparatus for obtaining heat from petroleum and other hydrocarbons, and in apparatus for supplying air to furnaces.*" April 9, 1868.

1215.—Ernest Dubois and Edward Casper, both of 101, Cannon Street, in the City of London, merchants, for "*Improvements in wet gas-meters.*" A communication. April 11, 1868.

1237.—George Glover, of Ranelagh Road, Pimlico, in the co. of Middlesex, for "*Certain improvements in the arrangement and construction of submerged or subaqueous lamps, and in the fluid used in and adapted to such lamps.*" A communication. April 15, 1868.

1249.—Henry Sugden Evans, of the firm of Evans, Lescher, and Evans, of Bartholomew Close, in the City of London, for "*Improvements in taps, valves, or apparatus for measuring and registering the quantity of liquid passed therethrough.*" April 16, 1868.

1252.—Henry George Fairburn, of 45, Goswell Road, E.C., in the co. of Middlesex, engineer, for "*Improvements in portable machinery for turning, screw-cutting, boring, and slotting; also for cutting off tubes or solid bars into any required lengths.*" April 17, 1868.

1279.—John Cooke, of Darlington, in the co. of Durham, mining engineer, for "*Improvements in the construction of rotary engines and pumps.*" April 20, 1868.

1374.—Victor Delperdange, of the city of Brussels, in the kingdom of Belgium, civil engineer, for "*Improvements in the construction and modes of connecting pipes or tubes of metal or other material.*" April 27, 1868.

1429.—William Edward Everitt, of Birmingham, in the co. of Warwick, tube manufacturer, for "*Improvements in the manufacture of copper, brass, and metal tubes.*" May 1, 1868.

1655.—William Tijon, of Great George Street, in the city of Westminster, engineer, for "*Improvements in steam-pumps.*" May 20, 1868.

1692.—Jules Oury, of Blois, in the empire of France, civil engineer, for "*An improved construction of meter or apparatus for measuring liquids or gases, applicable also for obtaining motive power.*" May 22, 1868.

1872.—George Watson, of Bromley Street, Commercial Road, in the co. of Middlesex, engineer, Walter Joseph Baker, and Samuel Thomas Baker, both of Southwark Bridge Road, in the co. of Surrey, civil engineers, for "*An improved artesian tube-well and lifting force-pump.*" June 8, 1868.

1930.—Clément Rostaing, of 29, Rue le Marois, and Elie Vivet, of 43, Rue des Bourdonnais, both in Paris, in the empire of France, for "*An improved material suitable for making steam, water, and gas-tight joints, and for similar uses.*" June 12, 1868.

1954.—William Cameron Sillar, of 62, Cornhill, in the City of London, bullion broker, Robert George Sillar, of 3, Grange Road, Upper Norwood, gentleman, and George William Wigner, of Grove Lane, Camberwell, chemist, both in the co. of Surrey, for "*Improvements in deoderizing and purifying sewage and making manure therefrom.*" June 15, 1868.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

1990.—Richard Alfred Godwin, "*Improvements in pumps.*" Aug. 9, 1861.

2075.—Frederick Gye, "*Improvements in constructing gasometers and gasometer-tanks.*" Aug. 20, 1861.

Parliamentary Intelligence.

HOUSE OF COMMONS.

(*Before Lord* George Cavendish, *Chairman; Lord* Pelham, *Sir* R. Blennerhasset, *and Mr.* Torrens.)

DERBY WATER-WORKS BILL.

TUESDAY, MAY 26.

Mr. Venables, Q.C., and the Hon. Granville Somerset were counsel for the promoters; and Mr. Rodwell, Q.C., and Mr. Bidder for the petitioners (the corporation of Derby).

Mr. Venables said the case itself was a proposal merely on the part of the company, which already supplied the town with exceedingly good water, to supply it with more of the same water, its capital requiring an increase, and that capital being the only means of providing an additional supply. The town of Derby was originally supplied with water by an old water company established some time in the last century, who pumped without filtration out of the river Derwent, which ran through the town, and brought it to a reservoir on a low level, which was not sufficient to supply the town; and he believed the inhabitants at that time were principally dependent on wells. As far back as thirty years Mr. Hawksley was first asked to advise some parties as to the means of getting a better supply at that time, and for several years afterwards the then corporation were urged to take up the question of the supply, and to undertake it themselves; but on several occasions they declined to do so. In 1846 the subject was again agitated, and again the corporation decided that they would not take it up. The consequence was that a company was formed in the following year, and Mr. Hawksley laid out the works by which the town was at present supplied. According to the practice at that time, two commissioners went down from London to Derby on behalf of the Board of Health, one of them being Mr. Rickards, now the Speaker's counsel, and the other Mr. Milne, the very eminent engineer of the New River Company. A full inquiry was instituted by those gentlemen, and Mr. Hawksley's plans were explained to them. In the district [pointed out on a large cartoon] were various springs of water, which were taken for the purposes of supply, the remainder being from a place immediately adjacent to the river—not the river itself, but from filter-tunnels or large wells, which were sunk at a distance of some 20 or 30 yards from the bank, and into which the water from the river found its way through a natural filter, the soil, which was gravel, being very well adapted for that purpose. From thence the water was pumped to a high level, and Derby was supplied by pressure without further pumping, and the water of these filter-tunnels was mixed (in proportions which varied more or less according to the season and the demand) with the water of the springs in about equal quantities. When the demand was small in winter, then the proportion of spring water to the water from the river was as 3 to 1; at all events, there was but little difference between the two waters, the analysis showing that when it was mixed, and mixed with the largest proportion from the Derwent, it was of excellent quality—in fact, unusually good and suitable for the purposes of the town. So far the supply had satisfied the people of Derby, and there had been little or no complaint; and in the course of the controversy which had lately arisen it had practically been admitted that the company's affairs were properly managed and the supply sufficient. Mr. Hawksley seemed to have been exceedingly accurate in his calculations, both of the quality of the spring water and of the quantity that it would be necessary to take from the Derwent. In 1848 he provided for the supply of 1,200,000 gallons a day, in very much the same proportions of spring and river water which he then stated, and he had now about reached the extent to which he could go with his present capital and works. The district at present supplied included the borough of Derby and the district of Litchurch, which was a suburb, but not within the borough, and it had a separate Board of Health of its own. The whole town of Derby, including Litchurch, had about 60,000 inhabitants, of which the company at present supplied 44,000, and it was of course desirable to provide means both for suplying whatever number were likely to take water out of the remaining 16,000, and also to provide for the increase of population, which went on there as it did in most other trading towns, and which, especially if the silk trade became flourishing, would be very rapid and large. In addition to Litchurch, the company by their bill proposed to supply several villages around it, mostly populous places, but still hardly large enough to obtain a supply for themselves. They were all, or most of them, imperfectly supplied, and it was evident that it would be to their advantage, and not to the disadvantage of anybody, that they should derive a supply from the same district as Derby; and there was one special reason for it, as regarded all those, at least, which lay south of the town, and that was that the river naturally became so foul that they could never get any supply from it. Above Derby the river was very pure, but below the town it received the sewage of the town, therefore there could be no doubt that they should be included. None of the villages objected, but witnesses would be called from some or all of them to show how advantageous it would be to have a supply from the company. The authorized capital of the company was £40,000 share capital, with £13,000 of borrowing powers, making £53,000. They had, however, expended £60,000 in supplying 44,000 people with 1,200,000 gallons of water, and they asked by their bill for powers to raise another £60,000, with £15,000 borrowing powers, which would, of course, provide for double the number of persons for a probable increase for a generation, or about 30 years. The source from which they wished to take the water was simply an enlargement of their present mode of supply. They could not increase the supply of spring water, because they had got all they could have in the district, but they proposed to lay down additional filter-tunnels to the extended works, which would be practically on the same level as the existing works; they would pump it up there, and there, as was the case with the present supply, it would be again filtered. It was an unusual thing to filter water twice, especially when in the first instance it was much purer than river water in general; however, it filtered itself, in fact, through the filter-tunnels from the bed of the river, and then again it was filtered by proper filtration-beds at the works; and when delivered the water was, he believed, peculiarly sparkling and bright, and of an unusually good quality. They could not, as he had said, take more water from the springs, or they would do so; but as they had taken all of any considerable value, the arrangement they proposed was the cheapest and most rational they could make, and one would have thought there would be no opposition to it. The majority of the corporation, however, had lately formed a desire to purvey water for themselves, and so they opposed the bill. They had had the power of doing so in former years. It had been offered to them over and over again, but they declined to negotiate, as was supposed for the reason that the company was then paying only 3, 4, or 5 per cent., and was not so good a concern as at present. In the beginning of 1867 a memorial was presented to the corporation as the Board of Health by certain ratepayers who were assessed to the amount of £11,000, whereas the assessment of the borough was £164,000, and none of them, he presumed, were inhabitants of Litchurch, because that was not in the district of the corporation. The memorial was to the effect, that in their opinion the supply of water to the town, whether it was regarded as an indispensable sanitary agent or for extinguishing fires, should be under the complete control and direction of the Board of Health, and that as they (the local board) had power to purchase by agreement, it was in their opinion highly expedient they should take the acquirement of the water-works into their consideration, so that they might become the property of the town, and thus do away with the institution of those vexatious proceedings against consumers to which many were subjected who had no desire or intention of evading the bye-laws and regulations of the company. The memorialists also stated that as the plant of the company was sufficient for the requirements of the town containing its present population, there was a reasonable prospect of the water-works, under better management, becoming a source of considerable revenue to the borough, which might lead ultimately to a lessening of the rates of sanitary and other improvements. It was evident, therefore, that the memorialists did not complain of the quality of the water, and as they said that the plant was ample for a much larger population, they had nothing to say against the quantity. They did not complain of the rates; they complained of nothing whatever, except as to some trivial matters about enforcing the bye-laws of the company against consumers, who, as they said, had not intended to evade them. This, he could prove, was a very trivial complaint, and he should dismiss it from any further consideration. All that the memorialists, therefore, said, was that the works were of so excellent a quality that the corporation ought to acquire them, and ought to supply water from the Derwent, and from the springs, even when the town reached double its population; therefore, they were all pledged to one opinion—that the quality of the water was undeniable, that the quantity was superabundant, and that the undertaking ought to be continued, and ought not to be superseded by anything else. The corporation took the memorial into consideration, and a correspondence was opened between them and the company; but the company were not anxious to sell their works, and they declined the proposal, and so there was an end of the matter for the time. It being necessary for the company to increase their capital, the subject was revived at the beginning of the year; and a member of the council, a gentleman named Madeley, who had taken a leading part in the opposition, brought the subject before the board, who passed resolutions to oppose the bill, and that it was desirable to take steps for the corporation to become owners of the works. Mr. Madeley, in speaking of the preference of the springs to the water from the river, said: "True it might be said that the water was well filtered; and so it was, and upon the whole it was wonderful that it could be improved as much as it was; but there were indications of a hardening tendency about it, which showed its qualities, and which might be seen in the scales which had to be removed from the vessels in which the water was used for culinary purposes." Now, if Mr. Madeley had gone deeper into the question, he would have known that those scales were caused by the lime which undoubtedly existed in the

water; and, though filtering was an excellent thing for the purpose of getting rid of impurities held in suspension in the water, it was not of the slightest use for the purpose of getting rid of matters held in chemical solution. The filtering only made it a great deal clearer. Mr. Madeley admitted that the company managed their business well; but he said they were not called upon to account minutely to the public for "many little things," and on the whole he advocated the policy of the works being purchased by the board. There was no bill, however, before the committee for purchasing the works, and there could be no evidence that the local board could supply the water at a lower rate. After this, a public meeting was called in pursuance of the recommendations of the corporation for adopting a petition to Parliament against the company's bill, and also for the purpose of ascertaining the views of the ratepayers with respect to the local board treating for the purchase on equitable terms. The result of the meeting was, that the proposition of the corporation was rejected by a very large majority, there being quite "a forest of hands" held up against it. The corporation, however, still persevered in their opposition, and they very shortly changed their ground. They had opposed for the professed purpose of acquiring the works; but, seeing that they could not accomplish this, they suggested that the company ought not to have the power that they asked for, because they ought to get the water from some other place. It was alleged in their petition that there was water to be had somewhere else of a better quality, and more abundant in quantity. Now, there might be water to be had in many places, but as they did not say where, they would not be entitled to go into the question. Not having had their attention pointed to it, the company had not inquired into it, or, at least, the witnesses who would be called for the company were so thoroughly acquainted with the district, that they would be able to say at once there was no such source as that suggested; but he presumed the committee, following the rules of Parliament, would not allow the opponents to set up any such scheme, it not being before the committee, and the company having no power to meet it, there being also no means of proving that the scheme would be practicable, that the landowners would consent, and in other ways that there would be any possibility of carrying it out; but in a letter, or in a resolution forwarded with a letter to the company, the corporation did condescend a little upon their general meaning. In their petition they gave no indication of what they meant, but in a letter they said: "There is an abundant supply of pure spring water to be procured from the gritstone formation within a very short distance of the main works of the company, capable of giving a continuous supply to Derby, even if the inhabitants were tenfold their present number." This was rather a liberal way of speaking, seeing that the quantity that would be required for that number of inhabitants would be something like 12 million gallons a day. The officers of the company, in consequence of that letter, searched the neighbourhood for the springs alluded to, but found that it was all imagination, and that, in fact, no such springs existed. The words "within a very short distance" they supposed meant within such a distance as would naturally form a part of the present sources of supply, but there were no such springs, or no springs worth taking in point of quantity. Evidently the corporation must have known that with the present plant they could not increase the quantity of the spring water, and if they increased the quantity at all it must be from the water of the river, so that they contemplated, if they purchased the works, doing what the company now proposed to do—namely, getting their supply from the Derwent. The only difference, then, was this, that the company wanted more money, as it was evident that what the corporation contemplated doing they would have been able to do in a less convenient manner. Ultimately they wrote a letter stating that if the company would give an abundant supply of exclusively spring water they would withdraw their opposition. They must have known there was no provision in the bill for doing this, and therefore the receipt of their letter was courteously acknowledged, and they were left to take their own course, which resulted in their petitioning against the bill. Although the corporation represented the town of Derby, yet they did not represent the villages which the promoters now proposed to supply, nor did they represent Litchurch, which had an independent local board of its own. The petitioners, on the present occasion, objected to the extension of powers sought by the bill, and submitted that the same were unnecessary, and, if sanctioned, would seriously affect the health and general sanitary welfare of the inhabitants of the town of Derby and the district proposed to be supplied with water. He thought the company would be able to satisfy the committee that they were going to supply the same water as before, and that it was undeniably good and would bear favourable comparison with many other towns similarly circumstanced. The next allegation of the petitioners was that when the Act of 1848 was obtained it was represented by the company that the supply would be ample, from springs only, for twice the population of Derby, including the hamlets of Litchurch and Little Chester. In answer to this he might state that the fullest inquiry was made by the commissioners, and that Mr. Hawksley then said that he proposed to mix the waters of the springs and of the river in nearly the same proportions in which the water had since been supplied. He was perfectly aware at that time that his gathering-ground of the springs would not enable him to supply an unlimited quantity of water, while the gathering-ground of the Derwent was practically unlimited, being nearly 400 square miles. Difficulties also came in his way which prevented his getting some small portion of the spring water on which he calculated. Then they said that the springs had been found inadequate, and that in order to make up the deficiency the company were taking their water from the Derwent, so that the quality of the supply was much deteriorated, and greatly inferior to that which was supplied to the towns of Buxton, Bakewell, Matlock, Matlock Bath, Cromford, Belper, Milford, and Duffield, containing at least 40,000 inhabitants, with mills and factories, dye-works, &c., situated above the place where the company took the water from the river, and that the sewage from these towns and works was emptied into it. It was true that these towns were situated on the river, but it was at such distances that if the sewage did find its way into the Derwent it could not by any possibility affect the water at the place where the filter-tunnels of the company were situated, and Buxton, Bakewell, and Matlock might be fairly struck out of the question altogether. The towns lower down might affect the water, though even they were a considerable distance off, and any impurity which passed from them into the river would be diluted by the very large body of water between the point where it so went into the river and Derby. To take the town of Belper, he might observe that Messrs. Strutt, the owners of large works there, took the most anxious precautions to prevent impurities from passing into the river. Then the petitioners said that, in their opinion, a larger use than at present of the waters of the Derwent was contemplated by the bill. This might be true, for if the company did not have the power they asked for, and an extension of the capital, they would have to pump harder from the existing filters, so that they would be taking more water from the Derwent in reality than what they were now taking, as the water in the river, unlike the springs, was elastic and inexhaustible. And this circumstance, and the hardness of the water, caused by its running through a limestone district, would, they said, be detrimental to the inhabitants of Derby in a sanitary point of view, and all the more injurious in the height of summer at a time of drought. In answer to this allegation the company would be able to show that the pollution of the river had diminished, and that the hardness of the water they could not help. The water had been supplied to the town without complaint for twenty years, and, though they could not dig up the limestone and put down something else in its place, the company would give the inhabitants excellent water, such as they had hitherto been accustomed to. The petitioners then—"swinging round the circle," as the Americans said—came at last to the question of the diminution of water. As lords of the manor they had some mills, and they complained that the company, by their extended scheme, would diminish the water power, but they forgot that the company had the power to take the whole of the water of the Derwent; but surely they (the corporation) would not wish to starve the whole of the inhabitants of Derby merely because the company proposed to take a little more of the water which was used to turn their mills. They could not get a drop of water that was not in the watershed of the Derwent. It did not, for the purposes of the mills, signify a farthing whether the water was taken from the spring or from the stream. If they made works for collecting the rainfall at the gathering-ground, it would be so much rainfall abstracted from the channel of the Derwent; and whether it was taken away from the Derwent directly, or taken away before it reached the Derwent, it was, for the purposes of the mills below Derby, absolutely immaterial. If the corporation should seriously set up their interests against those of their constituents, they knew very well that, if any water was taken away from them for which they had the right to compensation, they would get compensation, and that compensation would enable them to put up steam-power to keep their mills going. Therefore the whole question upon that matter would be solved by a resort to the general law. It was a significant fact that none of the other millowners opposed; so that the river was not likely to be lessened of its water so much, after all. The next allegation was that, as the Local Board of Health was not established till 1850, two years after the company had obtained their Act, it was not practicable for them to establish works of their own. Now, it was just as practicable at any time since 1850 as now, but it was evident they had all along been satisfied with the supply, and the reasonableness of the rates charged by the company. A memorial had been presented to the local board urging them to treat with the company for the purchase of the works; so that it was clear that the reason for this was something connected with the bye-law, and not under the belief that they would be able to get better water. Then they said that it was the policy of the Public Health Act that local boards should possess water-works of their own. Now, Parliament had said that no local board should have the supply where it could procure sufficient water on reasonable terms from a water company, and by the 75th and 76th sections of the Local Government Act they were precluded from setting up works of their own if a water company supplied ample water on reasonable terms. Next they said that it was important that water-works should be in the hands of the local boards, in order that they might be in a position to secure good water for sanitary purposes, and that the powers given by the Act were defective unless they were so. Considered defective by whom? Not by Parliament, because Parliament had legislated exactly in the opposite direction; so that it was one of the oddest allegations he ever saw. Then they alleged that, if they had possession of the works, they should be able to secure for the town and its suburbs an abundant supply of the most pure and wholesome water that could be obtained, and that such a supply they were convinced might be procured from the hills and valleys of Derbyshire. Well, they might just as well have said from the hills and valleys of England, or from the sky; there was no more good in roving over the hills and valleys of Derbyshire than there would be in going up in a balloon to see if they could get more water out of the clouds. It was a vague statement altogether. What they wanted was not to go touring about Derbyshire, but to buy the works and derive the profit themselves. They distinctly admitted that the scheme propounded by the company was the cheapest that could be devised, but they said that the bill had been promoted without the shareholders of the company being consulted. What business was that of theirs? It had been announced to the shareholders, and they would be consulted when the proper time arrived for doing so. Again, travelling into a matter which was no business of theirs, the petitioners stated that the scheme had not the unanimous approval of the directors of the company. He could traverse that allegation by stating exactly to the contrary, and that, if the bill was allowed to pass, the price of water would be enhanced to consumers. They had said that the water was too cheap; so that he dismissed that allegation summarily. They next said "that the proposed works are defective in their engineering details." That meant that at the time the petition was drawn they thought the bill would come before the referees, who amused themselves with all sorts of little irrelevant inquiries into engineering. As, however, it had come before a committee, who would look at the merits of the case, he ventured to say that no evidence would or could be given in support of that entirely unfounded allegation. Those were not the first water-works that Mr. Hawksley had constructed, and, if he could not lay out a tunnel filter by the side of a river, he had better retire from practice altogether. And, lastly, the petitioners said they were prepared to prove that the requisite supply could be obtained in a much cheaper manner than that proposed by the bill. Evidently the opposition from beginning to end arose from that old feeling of hostility which corporations sometimes entertained to companies. He had been informed, but for what purpose he could not understand, that they were about to call evidence; if so, the promoters, he was sure, would be ready to meet it. He proposed, then, to call Mr. Hawksley, who would give a statement of the general facts of the case, whilst other witnesses from the villages which the company proposed to supply would speak to the great advantages which the scheme was likely to confer upon them; so that in the end he hoped the committee would not think that the company were asking for that which was not reasonable and proper.

Thomas Hawksley, Esq., examined by Mr. SOMERSET.

About thirty years ago I was first consulted with regard to a supply of water to the town of Derby. The scheme originated with the corporation of that day. I inspected the district for many miles around, and my opinion was that it was most desirable to take the water at a place called Little Eaton, where there are a considerable number of springs issuing from the gritstone rock, and also to resort to the river Derwent above the populated part of the town of Derby, and any works connected with it. In fact, I proposed the same supply as the company have at present. After consideration the corporation declined to become parties to supply the town with water. It was very much pressed upon the general body by an influential section of the corporation, but the general body decided against the adoption of that or any other scheme for the supply. In 1846 the question of water-works was again brought forward and discussed, and the same view as to sources of supply was entertained, and again the corporation, after consideration, declined to support the scheme. In the same year it was taken up by private parties, seven or eight years after the time at which the scheme was first entertained by the corporation, and for that year it failed. In consequence of the want of water private parties again took up the

scheme in the next year, and this resulted in the formation of the present company. In the year 1847 the whole county was re-examined as to the best source of supply, and the result was the same as that which had previously been determined upon, except that the scheme was about double what it had been in 1838. In 1848, the bill having been brought before Parliament, Mr. Rickards, the Speaker's present counsel, and Mr. Milne, the engineer of the New River Company, went down to Derby as commissioners, and they carefully examined the scheme, and personally inspected the sites from which the proposed supply of water was to be obtained. I ought to mention that that measure was, as all such measures usually are, very much opposed by many parties. The commissioners held a long investigation into all the allegations, and although the scheme, was opposed by landowners, by millowners, by the canal company, and so forth, ultimately it became practically an unopposed bill in consequence of the report of those gentlemen, though it was very much opposed in Derby. I put distinctly before the commissioners the fact that I proposed to take the water of the Derwent for the supply of the town in addition to the springs. It was acquiesced in by everybody, except, of course, the millowners, who objected to any water being taken, not merely the water of the Derwent, but of any tributaries whatever. I estimated, what has since proved to be the fact, that the admixture would be about half and half, or half spring and half river water. Dr. Bernayes produced samples of the water for inspection by the commissioners, and particularly referred to one sample, which was a mixture of one quarter of those springs, a quarter of Carr Brook, and half of the Derwent. The millowners received their compensation, and the corporation of Derby being millowners as well, they were recompensed in the same manner. Whatever water is taken from the watershed, whether it comes out of the Derwent or from springs and so forth, will equally affect the mills, with the exception of the small quantity we now require for the extended district, comprising little villages. We have power now to take any quantity of water we think proper for the town of Derby, and by this bill we ask for no further power. The 6th section of the Water-Works Clauses Act is specially applicable to this case. Section 5 of the Act of 1848 gives us power over the lands mentioned in the deposited plans, and that includes the river Derwent. The actual limits of 1848 included the borough of Derby and the township of Litchurch, where the principal trade, of the town are now being carried on. Litchurch has a Board of Health of its own. In 1848, 43,000 people were located in the district, and we proposed to supply about 60,000; the ultimate quantity we expected to be 1,200,000 gallons. We are supplying now, on the average of the whole year, rather more than 1,000,000 gallons a day, and in summer rather more than 1,200,000 gallons. I estimate the population we now supply at 44,000, so that the quantity is between 23½ and 24 gallons per head per day. We did not take water from the springs at Breadsall, because we were opposed by Mr. Crew, a landowner. We found afterwards that the water of the Derwent was preferable both as to softness and chemical purity, so that we simply abandoned that part of the project. There were great difficulties about the acquisition of the springs at Staveley Hill, which were not finally overcome till last year, when they were settled, I am sorry to say, by the decision of a jury, which, however, was in our favour. Under our Act of 1848 we have taken all the springs, with some very insignificant sections from near Holbrook, down the whole of the valley for two miles, and brought them to our works. We have taken Carr Brook, and we have made extensive filter-tunnels along the line of the river, and we have aggregated all those waters into one situation, where they come into a large circular reservoir. There we pump them on to the top of a highish hill, where they become stored and filtered. They are then brought into the pure water tunnel, that being the second filtration, and they are then conveyed by the main-pipe along the public turnpike road into the town of Derby, and then distributed by a very large ramification of pipes—perhaps some 40 miles—all over the town of Derby. The filtering-pipes are made especially for taking the water of the Derwent; it was part of the parliamentary project.

Mr. BIDDER did not dispute that it was contemplated to get water from the Derwent by the works.

Witness: The quantity which we estimated to take is about one-half. We intend to take as far as we can from the springs, and to supplement the springs by the Derwent water; but we know that the springs only give during a large portion of the year, as they give now, 400 gallons a minute, or a little more than 500,000 gallons a day. During the winter months the volume of the springs is larger, and we may then get 800,000 gallons a day. When the springs give that, of course we only draw from the river enough to make up the total quantity. When they do not give that, we take so much more from the filter-tunnels which are supplied by the river. I find that the springs are now giving exactly what I calculated they would give 20 years ago. The supply of water to the town, both as to quantity and quality, has been satisfactory to the town of Derby. I have never heard a complaint of any kind with regard to it. Better water for the general purposes of a town cannot be supplied anywhere. I am a great observer, as a matter of course, of water, and whenever I go into a town I cannot help remarking it. In 1867 a memorial was presented to the corporation asking them to purchase the water-works, and upon an application to the company they declined to sell. A meeting of the ratepayers was called, and they agreed with the water-works company, and disagreed with the corporation, and preferred that the company should carry on their business themselves. The town has been of that opinion ever since I have known it. It is better always that water should be supplied by a company properly constituted for that purpose than by a public authority, and I could give numerous reasons for it. My mind has never been changed upon that subject. I have made water-works for, I should think, half the public bodies in England, and I have never found any reason to doubt that the opinion is well founded. Water companies are generally successful in giving an admirable supply; it is their duty to do so; they are constituted solely for the purpose, and they succeed. Public bodies rarely do give an equally sufficient supply, and even where they ought to give a constant supply, as a rule, they have failed. There have been rumours that there are other springs, within what I suppose they will call a reasonable distance from the Derby works, which might be used. I have gone through the district several times since then, and I have examined all the springs. They say in their petition that in the neighbourhood there is a supply to be got, and that is all the information they give us. They say: "The committee is of opinion that there is an abundant supply of pure spring water to be procured from the gritstone formation within a very short distance of the main works of the company, capable of giving a continuous supply to Derby, even if the inhabitants were tenfold their present number." I, with several gentlemen, made an express examination of the district in consequence of this, and for the purpose of evidence we took a quart pot, a gallon measure, and a little notched gauge, and we examined every spring in the neighbourhood—every little dribble. Some of them were not as big as a quill, and most of them were measured with the quart pot; a few of them were measured with the gallon measure, and in two instances, I think, we applied the little measuring-gauge as being more convenient. The result of it was that we could practically, and especially in dry weather, get nothing significant out of that valley. It was altogether a delusion, and there was not the slightest foundation for the statement. Dr. Letheby, Dr. Odling, Mr. Simpson, and Mr. Crossley, were with me. We examined the Bottle Brook, about which a good deal of evidence was given in 1848, but that consists mainly of colliery water, and it is altogether foul, and never was intended to be taken, and never could be taken for the supply of Derby. There is but little difference between the Derwent water and the spring water in regard to their hardness. We took water out of the river Wye on the 17th of April. That was 11°, whilst the water from the Derwent was 10° of hardness. Then the river at the junction of the Wye and the upper portion of the Derwent was 10½° of hardness. The Allestree spring was 12°, but that is off our own works. There the Derwent receives the river Amber, the river Ecclesburn, and partly the water of Bottle Brook, and the mixture of all these makes the hardness 1½° greater. On the same day the water of the springs entering our works, where they were all collected together, was 11½° of hardness; and at the Midland Hotel in the town, close to the railway station, the most remote point of all, the water was 12½° of hardness.

Mr. SOMERSET asked if his learned friend disputed the excellence of the water.

Mr. BIDDER said that he would admit this much, that at certain times of the year they might get excellent samples of water.

Witness: I have been in these works and in Derby some scores of times since 1848, and I never saw the water in a bad state, or different to the samples that will be produced. More beautiful water I do not think any town has. There has never been any complaint till this bill was introduced, and the committee can easily understand why that is. I have never known the water in any other state than this: throwing my address card into the clear reservoir, though you could not read the name, you could see that there was a name upon it at the very bottom of the clear-water tank, at a depth of eight or nine feet; and not only that, but the card remained white. There are a great many clear waters which are yellow in a slight degree; then you can see the yellowness upon a card gradually deepening as the card sinks. The water from the river is filtered twice before it is supplied to the town. That is, however, owing to accident. The works were not arranged purposely for filtering all the water twice, but we observed that sometimes the spring water, being mixed occasionally with a little sand, and with some turbid water from the Carr Brook, it came in in a discoloured state, and it made the water in the lower reservoir a little turbid. The water is consequently pumped on to the top of the hill, where the second filtration is carried on, and it is reduced to the state in which it will be exhibited before the committee. I do not admit that the water is not so good as it was. Derby is very favourably placed with regard to the degree of mortality. It never was said that in 1848 the springs themselves were admitted to be sufficient. There is not the slightest foundation for the statement "that, in order to make up for such deficiency, water is now largely taken from the river Derwent, and the quality of the water supplied by the company is thereby much deteriorated, and is greatly inferior (as tested by analysis) to that which was supplied by the company several years ago." The object of this bill is to improve the supply of water to the town of Derby and its neighbourhood; to make provision for a period, as we hope, of from 25 to 30 years; and to provide a sufficient capital for that purpose. We think it right to provide for what we should call a generation, of from 25 to 30 years. The amount of population for which we are prepared to provide being 100,000, our calculation is that we shall supply in that time 2 million gallons a day, and we shall want, in order to enable us to do that, £120,000 in the whole. We have spent in providing 1 million gallons and its distribution about £61,000. Our capital and borrowing powers were £53,300, and we have spent in excess of our borrowing powers about £8000. We expect to supply the population with all the water they want. I suppose in Derby it may take about 25 gallons per head per diem. Derby is not a town to require a large quantity of water for manufacturing purposes, consequently we do not expect any considerable addition either of revenue or demand from that source.

THURSDAY, MAY 28.

Mr. *Hawksley*, further examined by Mr. SOMERSET.

The quantity which we shall supply per head per diem will, of course, vary. It will be larger during the summer months, and smaller in the winter, except during a period of frost, when the quantity delivered is larger than it is even in the warmest part of summer. Probably not so much will be required by the villages, because there are no trades of consequence located there. At the present time we supply seven-ninths to the domestic consumption, and two-ninths to the trades. We only partly supply the railway. The company take the greater quantity of their water from the river, which runs past the station; but for their refreshment-rooms, and the drinking-fountains, and other purposes where pure water is wanted, we supply them, as also the hotel. We have no opposition from the railway company at all. In our supply at present there is a little more Derwent than spring water, but so little that it may be fairly stated as half and half. Professor Ansted went to Derby on Tuesday (after the last sitting), and procured water in order to show the committee the exact state of the water at this moment. [Samples produced.] The place from whence the samples were taken is near to the market-place, about three miles from our source of supply. The other samples were taken from the reservoir on the 18th of May, whence the water immediately passes into the town after it has undergone the second filtration; and it is for that purpose that it is brought here, in order to show the committee what is the state of the water at all times, after undergoing the second filtration. I may say that it presents the same appearance at all times and seasons. The proportions in our future scheme will be practically the same. The chemical examination shows there is hardly any difference between the spring and river water. The different degrees of hardness I have already given, but then comes in this important matter—what may be called the normal hardness. After the water has been boiled—that is to say, put into the state in which it is used for many domestic and manufacturing purposes—the hardness of the springs at the works (previously 12°) was reduced to 7½°. The water of the river becomes reduced to 4° of hardness, and that is owing to this: it often happens, in a comparison of spring and river water, if the river water is hardened chiefly by carbonate of lime, the carbonate of lime is precipitated in the boiling, and the water becomes softened. If, on the other hand, the water is hardened by sulphate of lime, the sulphate of lime is not precipitated; and, after boiling, of course the water is only softened by the amount of carbonate which is precipitated, leaving the sulphate in solution, so that, looking at these results altogether, it really appears that, after all, the Derwent water is the preferable water for general purposes. A larger supply than we are giving now is not necessary for the present purposes of Derby, because the supply is practically unlimited; but, for future purposes, of course a much larger quantity is wanted. If everything could remain exactly as is now, our powers would be just equal to the demand upon us. Still there are 16,000 people in Derby whom we do not supply, and in the adjacent parishes about 11,000 or 12,000. Of

course, as we have taken all the springs, nearly all the additional water will have to come from the Derwent. One of our objects is this:—Our spring water conduit has been laid down now near upon twenty years. We are wanting to remove that conduit, which is a conduit of pot-pipes, and to replace it with an iron pipe; and when it is replaced, we shall perhaps, in the course of the operation, be enabled to pick up a few of the very small springs which at present escape us, and there are one or two small leaks which we shall be enabled effectually to stop. However, the great body of additional water must come from the Derwent, as by any means that we could apply we could not increase the amount of spring water so much as 100,000 gallons a day. We have expended about £60,000 in obtaining the 1 million gallons, and we anticipate having to spend another £60,000 in obtaining the second million gallons and in utilizing it. The villages within our extended limits are now almost entirely supplied by wells. Most of them are situated on the marls of the new red sandstone, the whole of which are gypsums, and of course afford excessively hard water. The water, too, is bad in other respects, and is oftentimes scarce. The water to the south of Derby, and in such villages as Osmaston, Normanton, Elvaston, &c., is much polluted by the sewage of the town. It is impossible for any person to resort to the river for it. Near to where the railway bridge crosses there is a very large sewer constantly discharging into the river. A supply of water from the company would be essentially a great boon to them, and to the villages both above and below Derby. There are one or two places which are situated at great heights, and those we should not supply immediately. The geological formations of the two sides of the valley are totally different. The one is chiefly millstone grit, and the other carboniferous limestone, and therefore there will undoubtedly be at different times some difference in the character of the water. The allegations with regard to the sewage of the town of Buxton flowing into the river are unfounded. There may be a few cases in which a little sewage gets into the Derwent, but to say that there is the sewage of 40,000 people flowing into it is simply inaccurate. In the watershed there are only four places which contain so few as 2000 people and upwards—namely, Alfreton, Bakewell, Belper, and Wirksworth. Assuming that the sewage of Buxton did go into the river, it was at a very considerable distance—about 36 miles from our works—and, therefore, it would become innocuous. As to the mills at Belper, I may state that Messrs. Strutt take extraordinary care of the sewage, which they dispose of in another way, and also of the dye matters; so that it is not reasonable to assert that there is any serious pollution of the water there. It is a "stock" allegation to say that the larger use of the Derwent water will be injurious in a sanitary point of view. It is untrue. The water of the Derwent is exceedingly good water *per se*, but the water we take is brought through a filter-bed—not of the ordinary construction, where the water goes generally through from 2 to 3 feet of sand, but it goes through 50 or 60 feet. It goes laterally through a natural stratum of sand and gravel. Ours may be described as a horizontal well. We call it a filter-tunnel because, no doubt, the river supplies the whole of that bed of water, and then we collect it out of that bed by means of a filter-tunnel; but otherwise it would not be known that the water was taken from the Derwent at all. No doubt when it is filtered it is as good as the filtered water of the Thames. I do not know what the petitioners mean when they say, "The present reservoirs of the company are insufficient for storing the spring waters when abundant after rain." We do not endeavour to store the waters except for use from day to day, and we find that that answers every purpose, inasmuch as the two waters are sensibly of the same degree of hardness in their normal state, and the permanent hardness of the river water is less than that of the spring water. We have no occasion to store. Then, with regard to the injury which the corporation allege will be done to their mills, I may say that, considering their fall is 2 feet 6 inches to 3 feet as a maximum, the quantity of water we shall take will be utterly insignificant when measured by power, that I should think they would never ask for it. They might have an infinitesimal award in their favour, I dare say, if they asked for it. I have already answered the allegation of the petitioners as to the desirability of the corporation purchasing the waterworks. All experience has shown that, where water-works are managed or conducted under the Act of 1847, the towns are better dealt with by public companies than they are by public bodies; and the thing is very obvious when explained, because in the first place, in the case of companies, the rates are determined by the Act of Parliament, and there is no charge upon the public purse at all; in the next place, the public, having no liabilities imposed upon themselves, are always stimulating the companies to improve their works from time to time, and to make greater outlays in their favour, because they do not suffer any pecuniary consequence by those outlays; whereas, in the other case, it happens that the public, as a general rule, oppose improvement when the works are in the hands of the corporation, because those improvements are the means of taxing themselves pecuniarily. Except in the cases in which water is supplied under certain very peculiar conditions, a better, a more permanent, and a cheaper supply is given by private companies than is given by municipal bodies or local boards. They have only one duty to perform, whilst the others are a fluctuating body, with numberless duties on their hands. We do not propose to enhance the rates at all. We consider the outlying portions even are practically one community. The corporation seem to regard the works as their own, and think they ought to be allowed to regulate the price and everything else; but this is a mistake. We take the risk of the supply, and Parliament gives us the necessary powers, and fixes the rates at which it shall be given, which we have never departed from and have no intention of doing. The maximum rate at present, I think, is 7½ per cent. Our charges are regulated by the house-rents, and in Derby the rents are low comparatively with a great many other large towns. Then the corporation say that we ask for too long periods for taking our lands and works. We take the usual periods, and propose to make the works as occasion requires. Lord Redesdale will not allow us to have more than five years for acquiring land, and it may be that the river-side land, or a part of it, we shall not want within five years; portions of it we shall want no doubt, because we shall make our filter-tunnels from time to time as occasion requires a larger quantity of water to be gathered. Then we must do it within the five years, or otherwise our power will lapse. If it were not for the technical objection it would be very much better, instead of having the time limited to five years, we should have a much longer time; but Lord Redesdale thinks it right, on behalf of the landowners, to place a limit upon us, and he requires it; it is not voluntary on our part. As to the allegations as to the works being defective in their engineering details and inefficient for the proposed objects, that the estimate of expense is inadequate, that the quality of the water is unsuitable, and that no proper provision is made for storeage-reservoirs, I may say in answer that no artist ever painted a picture but somebody thought he could paint a better, and I dare say somebody will come and say he can paint a better picture of water-works than ours. I know, however, that these works will answer the purpose perfectly, and it is on that account I have advised the company to present them for the sanction of Parliament.

Cross-examined by Mr. RODWELL: I do not, as a general proposition, prefer taking spring to river water, because spring water is inferior to river water in a great many cases. It is not more usual to get spring water purer than river water, but spring waters flowing from particular rocks are purer than river water; on the other hand, spring waters are harder, and in many respects inferior to river water. It is not a question of wholesomeness. On account of the coldness and the carbonic acid which spring water holds in solution it is much nicer to drink than river water. Spring water, as a general proposition, is not more wholesome and fitted for drinking purposes than river water. There are many rivers which are now so fouled that they, of course, must be thrown out of the account altogether; but river water in general, where it is not polluted, is amongst the best waters in regard to health, and better in regard to many other purposes than spring water. It is not quite so palatable as water taken from the spring itself, but when derived from the pipes of a water company, after passing through the heated ground of summer, no person can distinguish spring water from river water; the temperatures are exactly the same. It is not the effort of all engineers to get spring water and not river water; it would be very wrong if they did such a thing, and the best instance I can give you is the one now before me—namely, the river Thames. In London it would be the most improper source possible to take water from the Thames, whilst at Hampton it is a perfectly good source. I am sorry to say that nothing whatever has been done under the Thames Conservancy Act to keep the river in order. The Act has not been put into operation in the upper part of the Thames, and cannot be, except after twelve months notice. I know that it is not a necessity to take water from the Thames to supply London. There are myriads of gallons of water in the chalk formation all round London, which can be raised in the same way as they raise water at Derby, and be supplied direct to the inhabitants; nevertheless, it is better unquestionably, in an engineering and sanitary point of view, that London should be supplied from the Thames. I was an advocate for giving a supply to Birmingham independent of the river. The river Tame is a small river of only 20 miles in length, and upon it there are 300,000 people located, belonging to Wolverhampton, Bilston, Wednesbury, Walsall, and other large towns. We came to Parliament to get rid of that supply, because the water is now so polluted in a variety of ways, but chiefly by the establishment of chemical manufactories upon its course, that it contains 56 grains of solid matter to every gallon. This does not apply to any extent to the position of Derby and the Derwent. I think manufactories are not growing up on the course of the Derwent above our works, scarcely at all. At that time we were supplying a large portion of water from the Tame to Birmingham. We were supplying 5 million gallons a day from the Tame, and 2 million gallons from other sources. I believe that the entire population in the valley of the Derwent is so inconsiderable with regard to the magnitude of the watershed that any amount of sewage which they could put into the river would become entirely oxidized before it reached our works, and would cease to exist. Contamination is not a question of degree. It requires a certain quantity of water to completely effect oxidation, and it requires time, which is a measure of distance. At Birmingham many of the buildings which yield the sewage are now brought down almost to the upper side of the reservoir into which the water is taken. There is no filtration there, but simply deposition, and in that state it goes to the town, and whatever may be the popular opinion upon these subjects, it has never been the cause of producing disease; still I am not going to argue—I should think it absurd to do so—on the propriety of taking water from an impure river. At the mills of Messrs. Strutt, situated above Derby, the sewage is not allowed to go into the river, but is drained into cesspools, and there treated in a particular way, and made useful for agricultural purposes. At Belper very little sewage indeed goes into the river. The town is practically undrained by artificial means; the sewage is collected into cesspools, and is utilized upon land and gardens. The greatest possible care is taken by Messrs. Strutt to prevent escape into the river. Anything that flows off the ground goes into the brooks, and the brooks are feeders of the river; but if you mean from that that the sewage continues either in the brooks or the river, I do not admit that, because all those organic compounds have an enormous affinity for oxygen, and are immediately decomposed, and when decomposed their elements are as pure as ever they were. [The witness gave the population of other places on the river, and denied that their sewage flowed into it.] There are 100,000 people within the watershed of the Derwent, and that watershed has an area of 396 square miles. The villages of Alvaston, Osmaston, and Bolton, cannot, if they be so minded, resort to the river Derwent for the future supply, whether by a local board or otherwise, because the river is so polluted by the discharge of sewage into the river near the railway station that it is impossible to use it. The entire population of Derby discharge their sewage by systematic drainage into the Derwent.

Mr. BIDDER proceeded to cross-examine the witness as to whether he had inspected the waters of the tributaries of the river Ecclesburn.

Mr. VENABLES objected to Mr. Bidder going into any alternative scheme, or attempting to show that there were other sources of supply except in the immediate neighbourhood of the works, to which alone the corporation pointed in their letter.

Mr. BIDDER submitted that other sources were available.

A discussion ensued, and

The CHAIRMAN said that the committee thought, if there was any point where the opponents knew of springs that could supply the present works, questions might be asked, but they must be confined to that. The committee did not think it was competent for the opponents to go into any inquiry as to sources of supply over the hills and valleys of Derbyshire.

Mr. BIDDER asked if the witness could say there was not a sufficient quantity of water in the tributaries of the Ecclesburn, which, if ordinary impounding reservoirs were made to contain it, would provide all the additional supply required for the town of Derby.

Mr. VENABLES said his learned friend had fixed it to the river Ecclesburn and all its tributaries.

The CHAIRMAN said the inquiry must be confined to something in the vicinity of the works.

Mr. BIDDER asked the witness what he called a "reasonable distance" for the source of a supply of a town like Derby.

Witness: It must be determined by particular circumstances.

Mr. VENABLES: People talk of bringing water from the Bala Lake to London—that might be said to be a reasonable distance.

The CHAIRMAN intimated that the committee thought it was open to Mr. Bidder to ask the witness whether he had examined the springs to ascertain that there was no better supply to be got within a reasonable distance.

In answer to Mr. BIDDER, *witness* said that he examined all the springs in the neighbourhood. His general inquiry included all the watershed of the Derwent. He had investigated the tributaries of the Ecclesburn years ago, and they were rejected by the corporation themselves. From his examination of the springs, he was able to say definitely there was not an adequate supply to be found there.

Mr. BIDDER: Is not six miles for water-works a reasonable distance? In

the case of the Dublin Water-Works the distance is 20 miles, and in South Staffordshire it is 40 miles. I know your lordship thinks I am pertinacious, but I am not so, because I feel it is really the point which we have to bring before the committee, and which we feel of such importance to ourselves.

The CHAIRMAN said he had consulted the chairman of committees upon the subject, and he stated that it would not be open to the opponents to go into anything like a competing alternative scheme, that if there was a spring somewhere in the immediate neighbourhood of the works which the company had not made use of, they could examine the witnesses as to their not having made use of those springs. The committee could not go inquiring into sources all over the country.

Mr. BIDDER thought that if the chairman of committees had been deciding upon this very case, he would have said that though the committee could not go into detail upon a competing scheme, yet it was quite competent for a petitioner, who had made an allegation to that effect, to show that the works proposed were inexpedient because they might be better done in another way, or a supply taken from another source.

The CHAIRMAN thought the cross-examination of the witness must be confined to the spring water to be procured from the gritstone formation within a very short distance from the main works of the company.

Mr. BIDDER: Am I to understand that a "short distance" does not include the place to which I refer within six miles.

The CHAIRMAN said that the committee were of opinion that it did not extend so far.

Mr. BIDDER (to witness): In the water of the Derwent, I suppose you will admit that there is a certain amount of sewage contamination.

Witness: It enters into it at various places, but I do not admit that that is undecomposed during its flow, even that little.

Mr. BIDDER: I believe that there are two schools of opinion upon that—yourself and others representing one school, and others representing the other school; the one side considering that after flowing some miles all the noxious qualities of the sewage are to a great extent got rid of, the others considering that the sewage contamination cannot be got rid of, and that though the water may become bright in appearance, it may yet be as full of noxious and deleterious qualities as before.

Witness: I think there are not two schools; there are one or two individuals, but not persons who can properly be said to constitute schools, either in number or in knowledge, upon that subject. Those two or three persons do hold, or profess to hold, at all events to promulgate, those opinions.

Mr. BIDDER: Who are those gentlemen? Is Mr. Rawlinson one?

Witness: I do not think that it is fair to put me in a personal hostility with gentlemen with whom I come in contact. I do not know that Mr. Rawlinson does not agree with me, on this particular subject. I do not know what opinion he holds. I consider that a very short distance of flow is sufficient to purify a river polluted with sewage, that is if the volume of the water be considerable; but of course a longer distance of the volume is inconsiderable, because it is all a question of the quantity of oxygen contained in the water, and the opportunity it has of acting upon the water. Usually water contains from 30 to 40 gallons of oxygen in every 1000 gallons of water, and that oxygen immediately begins to consume any of those decomposable matters, and does entirely destroy them in a very short distance. Take Sheffield, for instance. There is a river that comes to Sheffield for about a distance of 20 miles; that river becomes amazingly polluted at Sheffield, it flows down about 20 miles, and there it has lost almost entirely its pollution; not quite, but almost entirely. It is then used by the town of Doncaster, and is pumped into the town for general purposes, and it is filtered and drunk in a great many of the houses of the town. The same thing occurs, but to a very much larger extent, in the river Thames. There are towns about Hampton, and yet at Hampton the quantity of organic matter (and it is always present, whether spring water or other water) is only 1½ grain in the gallon, and that of the most innocent character. The same thing occurs with regard to all the rivers and streams, not only of this country, but of other countries, and if it were not so the Atlantic itself would ere now have become a common cesspool. With respect to the Derwent, I may say that all traces of contamination are gone before the river reaches our works. I am satisfied that there is less noisome matter of any kind gets into the river now than there was in the year 1848. I believe that hereafter all rivers will become purer instead of becoming fouler, and in point of fact it is the fault of the Legislature if they do not. It is quite practicable. If ever the water of the Derwent becomes foul it will be the duty of the company to apply to Parliament for another source, but inasmuch as it is not now foul it is not their duty to do so. There are waters which contain a considerable quantity of oxidized organic matter, and yet may nevertheless be very bright. There are wells near cesspools that yield a very bright water, and yet that water contains oxidized organic matter.

Mr. BIDDER: The previous sewage contamination is oxidized organic matter, is it not?

Witness: I do not think so.

Mr. BIDDER: You will take the greatest proportion of water from the Derwent when the proportion of pure spring water poured into the Derwent is the smallest in relation to the proportion of sewage?

Witness: Yes.

Mr. BIDDER: Would you be surprised to hear that at times in your water there is found at Normanton as many as 1633 lbs. of sewage contamination in 100,000 gallons of water?

Witness: I should not only be surprised, but I tell you that it is altogether absurd; neither as delivered in the town nor anywhere else, and every chemist will tell you that that doctrine is perfect nonsense. I think that the Derwent water, purified by a long flow, is quite as good as spring water; it is better for certain purposes, inasmuch as its permanent hardness is less than spring water. I like hard water myself to drink, and as sparkling as you please—soda water, seltzer water, and all such things. The unreasonableness of the people of Derby is represented by the mouth of counsel, but the people themselves would not tell you the same story. The capital we now ask for is £60,000, and a borrowing power to cover contingencies of £15,000, and that is to be raised from time to time as required for the purpose of supplying the town with water.

Re-examined by Mr. SOMERSET: The oxidized organic matter means that after you have burnt your coal you find some ashes, and therefore it is to be inferred that coal has once existed; but the oxidized matter in water bears no more real relation to the matter from which it was produced than the ashes of coal do to the coal from which they were produced. There always have been gentlemen ready to say that sewage contamination never disappears. I do not think there is anything worthy of the name of a school existing here upon that subject. There are individuals, but their opinions have not the acceptance of the general body. As to the Board of Health putting their sewage into the river, they are obliged to get power from the Home Office to borrow money for that purpose, and the Home Office will take care that they do not foul the Derwent. If there is any deterioration of the river which can be prevented, it will be our duty to take legal proceedings for that purpose. I have found the water of the Derwent rather better than otherwise during the last twenty years. There is now no dye stuff allowed to go into it.

By the COMMITTEE: At times the river is very subject to floods, and a considerable quantity of peat water comes down; but no effect at all is produced upon the water, which remains much about the same. The distance through which it passes has the effect of filtration. It does not go through a small distance rapidly, but it goes laterally creeping along very slowly through the sand and gravel, and then becomes quite decolorized. Everything in the peat is completely removed, partly by mechanical filtration and partly by oxidation. I ought to mention another curious thing connected with that—that, when these heavy rains come, the springs rise, and become so large a volume, that we take very little water from the river then; we shut the valve which goes into the central reservoir, and supply almost entirely from the spring wells. I do not think the peat would have any effect in neutralizing the noisome properties of the sewage; both the peat and the sewage matters undergo oxidation—the vegetable much more slowly. The abstraction of 1 million more gallons per day has no sensible effect upon the volume of the river. It alters it about the 130th part of a foot in depth. I do not think the Derwent water will be materially deteriorated by the water of the river Amber. It has 29° of solid matter, but they are all innocent salts. At Matlock, I know that means are being taken to prevent any deleterious sewage going into the river. Matlock is distant about 14 miles, and that would be ample for the river to clear itself before it arrived at our works.

The COMMITTEE: You were engineer to the Sunderland works as well as the Derby. Would there not be this difference between the two cases: that as respects Sunderland you went into the districts and took their water; whereas in the Derby case you only propose to take the water from your present sources?

Witness: To some extent. In the Sunderland case it was nearly the same in this respect—that we did not go and take their water, but we went nearly to the edge of their limestone, to which they might also have resorted, as the people of Derby could have resorted to the Derwent, and we thought that, as we were taking the water to which, in the natural course of events, they would at some time or other resort, that Parliament would require us to carry the water into their district.

Josiah Lewis, Esq., examined by Mr. VENABLES.

I am the chairman of the company, a magistrate both of the county and borough, and a silk manufacturer in Derby. At first I did not think the scheme would be a profitable one, but ultimately I thought it would be to the benefit of the town, although I did not expect great profits. I am now of opinion that the supply of water has been highly satisfactory to the town, and of very great benefit generally. We use the water for one of the boilers at my mills, and we find that it does not require cleansing nearly so often as those supplied by the brook. The water is always clear and excellent in quality, and I do not remember any complaints being made about it. Once a gentleman brought a bottle of water, and said that every now and then there was sand in it, and upon investigation we found that his house was the last, or nearly the last, supplied at that end of the town, and being at the end of the pipe the sand settled there. We had the pipe lengthened, and there was no longer any sand to be found in his water. Our company have always been most anxious to work with the local board; and on several occasions, when disease threatened the town, we offered them additional water at a cheaper price—1d. per 1000 gallons. I think they only took about as much as came to £4 or £5. There are three members of the corporation on our board at present. As to the directors not being unanimous with regard to the bill, I must say that as far as I know there is not the slightest foundation for the statement. As to not consulting our shareholders, the simple answer is, that the proper time for that has not yet come. The subject was entered into before them at our meeting in February, and not one of them objected. I can testify to the quality of the water being very bad in the villages which we propose to supply. It is supplied from wells, and is very indifferent water indeed. It would not be possible for them to get a good supply from the Derwent, because of its being fouled with the sewage. As to the memorial, I think the most active person in getting it up was a customer of ours, whom we had taken before the magistrates for having used the water for trade purposes, whereas he only used it for domestic purposes. The case was dismissed on a technical point. I have no doubt it will be to the advantage of the villages named to be supplied by the company. If we obtain this bill, it is not our intention either to raise or spend our capital till we want it. We wish to supply the wants of the district as they require it. We have already expended our present capital, and something more.

Cross-examined by Mr. RODWELL: We require powers for Derby as well as for the villages. We have made no calculation as to the quantity of water the inhabitants of those villages would take from us; I think it will be time enough to consider that when the necessary time comes. There is nothing in the bill compelling us to supply them. Our dividend has not quite averaged 5 per cent. The last three or four years it has averaged 10 per cent. The larger our capital the better it ought to be for our shareholders—if well managed, certainly. Hitherto we have not been charging the maximum rates at Derby.

Mr. RODWELL: Supposing you have either the moral pressure or the legal pressure compelling you to supply these villages, will not any loss or diminution of dividend fall upon the persons at Derby whom you supply with water?

Witness: I do not know that it would.

Mr. RODWELL: But you have no power to make up the loss of your speculation in respect of those villages.

Witness: Such a thing never entered into my head.

Mr. RODWELL: But, although it has never entered into your head, it has entered into the heads of my clients, some of whom are here. Does it occur to you that that would be the natural result?

Witness: No, certainly not; it is the last thing in the world, I should think.

Mr. RODWELL: Has it entered into your mind that you will recoup yourselves by rates if you find you are losers?

Witness: We shall never raise our rates, as long as I am chairman, under such circumstances. I am happy to say we are very unanimous on that subject.

Re-examined by Mr. VENABLES: We shall supply the villages, if we can do it without loss, certainly. We cannot be compelled to do it, unless the water-rate paid by them should be one-tenth of the expense of providing and laying down the pipes. Under any circumstances we shall not do the inhabitants of Derby any harm by this bill.

Mr. *Walter Boden*, examined by Mr. SOMERSET.

I lived at Litchurch Grange in 1854, and now have works at Derby; I am, in fact, the owner of Litchurch Grange. I consider that the company supply good water, and I am perfectly satisfied with it. I visited the reservoir of the company on the 15th of May, and I was much struck with the clearness of the water. I picked up one of the smallest pebbles I could find on the walk, and I dropped it into the water, and I could see it distinctly going all the way down, and also as it lay at the bottom, at a depth of seven or eight feet. I think that the district will be benefited by the extended supply, and I hope that Parliament will pass the bill.

Cross-examined by Mr. RODWELL: I do not think that the clearness of water is any criterion of its purity. I have never drunk water from the pumps of the Temple or Lincoln's Inn.

Mr. *Thos. George*, examined by Mr. SOMERSET.

I have carried on business in Derby for upwards of 26 years. The water-works certainly have been a great advantage to the town. I drink the water myself, and I hear of no complaints respecting it. I live at Littleover, which is one of the villages that the company propose to supply. It would be a good thing to have the company's water there.

Mr. *Jas. Hayward*, examined by Mr. VENABLES.

I am in business at the Phœnix Foundry, Derby. Our men use the water for drinking purposes, and they are perfectly satisfied with it. I live at Littleover, and get my supply at present from a well. Our supply is short at times, and we have to beg or borrow as we can.

Mr. *Thos. Harvey*, examined by Mr. SOMERSET.

I am in business at Milford, and can state, with regard to Messrs. Strutt's mills, that during the last 10 or 12 years considerable alterations and improvements with regard to the sewage have taken place there. The dye water is not allowed to flow into the river, and dry-earth closets are now used instead of water-closets, and the refuse is carted away for agricultural purposes. The ammonia from the gas-works has always been carted away to farms. I have seen fish caught in the Derwent—a pike, but not grayling.

Cross-examined by Mr. RODWELL: I cannot say that everything objectionable at Milford is excluded from the Derwent; the drainage from the village goes to the river. There are 1600 or 1700 people there, and there are 300 earth-closets, which have been erected by the Messrs. Strutt. I do not think I should like to drink the water of the Derwent in heavy rains.

Re-examined by Mr. SOMERSET: None of the drainage goes into the river except from the roads.

Mr. *J. Tym*, examined by Mr. VENABLES.

I am joint clerk to the magistrates at Belper, and I hold other offices there. The liquid drainage from the houses first finds its way into a large tank, which when full is emptied by the Messrs. Strutt, and is used on the land. The road drainage in rain goes into the Derwent. I have never found the water of the river disagreeable, and I have used it for years. I am the manager of the water-works at Belper. We get our water from two springs, and it is stored in reservoirs. We supply about 550 houses.

Cross-examined by Mr. RODWELL: A portion of the town sewage still runs into the Derwent. We have never had any water from our works at present from the river.

Mr. *A. G. Greaves*, examined by Mr. SOMERSET.

I have practised as a surgeon in Derby for the last thirty years. Very great improvement has taken place in the sanitary condition of the town by the construction of the water-works. I think the water is extremely good. I have never heard any complaints about it—neither as to the quality nor the supply. Derby contrasts favourably with most towns as to the rate of mortality, and I believe this is owing very greatly to the excellent supply of water which we have.

Cross-examined by Mr. RODWELL: No doubt many of my poorer patients have no water in their houses, and it would be a very desirable thing if they were supplied with it. I have heard it said that it has been on the ground of expense that the supply has not hitherto been given. I have never heard a complaint that the water-works company did not or would not supply them. I would sooner see a state of things where the landlords or tenants of the poorer tenements would be obliged to take the company's water than be without it.

Re-examined by Mr. SOMERSET: I know that the Local Board of Health can now compel a supply of water to these houses. I have no doubt that the rate of mortality has decreased, and the amount of sickness also. Zymotic diseases do not prevail with us now to anything like the extent they did twenty years ago, and when we do get them they are never so severe.

(*To be continued.*)

Miscellaneous News.

WESTERN GASLIGHT COMPANY.

The Ordinary General Meeting of Proprietors was held at the Company's Offices, Argyll Street, Regent Street, on Thursday, Aug. 27—L. SIMPSON, Esq., deputy-chairman, presiding.

The SECRETARY (Mr. S. Barber) read the advertisement convening the meeting, and the following report of the directors was presented.

The directors have the pleasure to submit to the shareholders the annexed statement of accounts for the financial year ended the 30th of June last.

Although, owing to the exceptionally warm and bright weather, the last half of the year was not a favourable one for the consumption of gas, the gas and meter rental for the whole year amounted to £118,596, being £7646 in excess of the year ended June, 1867. Coke and other products returned £849 less than in the previous year.

The sum required for the authorized dividend of 10 per cent. on the share capital is £35,000, and the divisible profit resulting from the year's operations is £33,991.

The directors recommend that the following dividend at the usual rate per cent. be now declared for the second half of the year, viz.:—

10s. per	A share	. . . . .	£10 paid.
6s. ,,	New B ,,	. . . . .	6 ,,
6s. ,,	C ,,	. . . . .	6 ,,
1s. ,,	D ,,	. . . . .	1 ,,

An agreement has been concluded with Colonel St. Quintin by which the company acquires an additional piece of land, containing 10¼ acres, for a term expiring in the year 1959. The company's freehold and leasehold lands will now form a compact estate of 21¼ acres, bounded by canal on the north side and by railway on the south.

With regard to the metropolis gas question, of the four bills mentioned in the directors report to the general meeting in February last as having been introduced in the House of Commons—namely, those of the Chartered and Imperial Gas Companies and the Corporation of the City of London, and the Companies Amalgamation Bill—one only, the Chartered Bill, has become law.

A fifth bill was subsequently introduced, having for its object the amendment of the Metropolis Gas Act, 1860, as affecting all the thirteen companies, and the companies, continuing the conciliatory course they have ever pursued when there has appeared an opportunity of effecting a fair compromise, came to an agreement with the promoters, by which the opposition of the companies to the second reading was withdrawn, and the bill modified in the House, before being referred to a select committee.

This bill, however, with the other bills before mentioned, except the Amalgamation Bill (which was allowed to drop), was afterwards, and against the protest of the companies, referred to a committee, of whom three (out of the five members), including the chairman, Mr. Cardwell, were on the committee of last year, and had already decided adversely to the companies.

The committee adhering to the views expressed in the select committee's report of the preceding session, the companies found it impossible to effect any reasonable arrangement, and therefore declined to surrender their existing rights.

Mr. Cardwell thereupon threatened to pass the bill promoted by the corporation, empowering them, with the aid of their corporate funds, to enter upon a competition with, and which they avowed would be ruinous to, the three companies supplying gas in the City district.

This threat caused those companies (first the Chartered, and subsequently the Great Central and the City of London) to give way and submit to the committee's exactions. "The Metropolis Gas Bill," which was intended to apply to all the companies, was then altered by the committee into what has since become "The City of London Gas Act," and its provisions are by the Chartered Company's Act applied to their district outside the City.

The Act materially affects the rights of the three companies included in it, but the Western Company and the nine others who do not supply gas within the City limits retain their statutory rights unaltered.

As the result of the contest does not satisfy the opponents of the companies, the agitation is continued with the view to a fourth campaign next session.

Messrs. Lightly Simpson, Thomas Wilde Powell, and William Thomas Makins, directors, and Thomas James Briggs, auditor, retire by rotation, and respectively offer themselves for re-election.

Dr. *Revenue Statement, for the Year ended June 30, 1868.* *Cr.*

To Coal			£53,463	8	6		
Supervision and labour			12,492	9	8		
Purifying materials, water, oil, and sundries			4,028	15	0		
Works renewal			8,647	7	9		
Restoring pipes and meters			3,394	6	8		
Lamp lighting			1,750	3	8		
Repairing lamps			443	9	0		
Direction and audit			1,370	0	0		
Salaries			3,623	0	2		
Collector's commission			1,336	1	4		
Rents, rates, and taxes			1,489	0	0		
Stationery and printing			266	9	7		
Parliamentary and incidental expenses			1,558	12	6		
Bad debts			758	5	1		
Leasehold redemption-fund			50	0	0		
Profit of year to June 30, 1868, carried to profit and loss account			36,146	0	4		
			£130,817	9	3		
By Gas						£115,576	14	0
Meter-rental						3,020	1	10
						£118,596	15	10
Coke			£5,876	2	4			
Breeze			2,186	2	11			
Tar			4,961	0	2			
Gas liquor			97	8	0			
						12,220	13	5
						£130,817	9	3

Dr. *Profit and Loss Statement, June 30, 1868.* *Cr.*

To Interest on loans			£ 2,154	8	8		
First half year's dividend, declared February last			16,000	0	0		
Balance to be appropriated			21,228	7	0		
			£39,382	15	8		
By Balance from June 30, 1867						£18,736	15	4
Less dividend declared August, 1867						15,500	0	0
						£3,236	15	4
Revenue account (profit of year, to June 30, 1868)						36,146	0	4
						£39,382	15	8

Dr. *General Balance-Sheet, June 30, 1868.* *Cr.*

To Proprietors capital, viz.:—							
20,000 A shares (£10 each)		£200,000	0	0			
10,000 new B's (£6 paid)		60,000	0	0			
10,000 C's (£6 paid)		60,000	0	0			
20,000 D's (£1 paid)		20,000	0	0			
					£340,000	0	0
New B share loan account		£ 5,568	0	0			
Bonds and debentures		38,500	0	0			
					44,068	0	0
Sundry creditors					10,882	12	0
Unclaimed dividends					174	2	0
Leasehold redemption-fund					180	17	11
Profit (balance to be appropriated)					21,228	7	0
					£416,533	18	11
By Permanent investment						£353,156	1	3
Sundry debtors						37,260	0	4
Stock in trade						11,740	1	1
Cash in hand						14,377	16	3
						£416,533	18	11

The CHAIRMAN: Gentlemen, in consequence of the absence of your chairman, Mr. Russell, who so efficiently presides over your meetings, I have been called upon, as your deputy-chairman, to take the chair to-day, and to make the few remarks which are rendered necessary on the present occasion. This year, by reason of the extraordinary brightness of the weather, a considerable decrease is shown, at least a decrease from 10 per cent., which is about the normal increase in the consumption of gas, to 7 per cent.; but notwithstanding this we have added to the number of our customers 758, showing thereby the elasticity of our district, and this will be a satisfactory feature to you, because there is less of uncovered land. The land being rapidly covered over will, of course, become an increased source of revenue to the company. During the past year we have added to the quantity of land which we possess, 10½ acres or thereabouts, and this, we think, is a wise measure in order to provide for the extension to which we allude. We all know the difficulty there is for companies situated as we are to obtain land in the neighbourhood of their works. Often it has to be acquired at enormous cost, but we have made provision on terms which, I think, will be eminently calculated to promote your interests. We have also, during the past year, procured a new gasholder, and moreover we have fully maintained the whole of your balance in its integrity; and I think you will agree with me when I say that, taking all these circumstances into account, the dividend we have to present to you is a satisfactory one. We have had several drawbacks upon the amount of our revenue, caused by the compact which we entered into with Parliament in 1860. We then agreed that we would maintain a certain standard of illumination, and that we have done so we are prepared to prove; indeed we are prepared to prove that our gas has been in excess of that standard. We also agreed that we would maintain an amount of purification from sulphur and other matters which are difficult to separate from the gas, and in order to ensure this we have expended more than £1000 in again resorting to lime purification, in addition to purification by oxide of iron; and all this we have done so that we might present gas to the public in as pure a form, commercially speaking, as it can be obtained anywhere. That we have supplied this an independent examiner, in addition to our own, is prepared to prove, and by his daily register he can show that we are even in excess of what is actually required under this head. Gentlemen, we have also made, since the Act of 1860, a voluntary reduction in the price of our gas, without accumulating the reserve-fund which we were entitled to under the Act of Parliament. We take a little pride in having led the way to that decrease, the amount of which is stated to be something like a quarter of a million per annum. Well, gentlemen, the net increase of income for the year is nearly £7000, or 5½ per cent. The products have fallen off, as you may observe, particularly in the article of coke. We use a different kind of coal, and get the commercial results in the quantity of gas, and not in the quantity of coke obtained, so that we can account for the diminution on that head, which is not in the price of coke, but in the diminished quantity that is obtained. As regards the accounts, in 1867 we carried forward £3236, and this year—1867 and 1868—we carry over a balance of £4227, or an addition, in round numbers, of £1000. We have also had to pay upon increased capital extra dividend to the amount of £2500 for the year. I may also say that, in regard to the question of coal, we have an additional cost on the same tonnage of upwards of £800 for the year. All this will show you, I think, what I said before, that we have reason for congratulating ourselves that we have succeeded in maintaining your dividend in its integrity, notwithstanding the varying circumstances I have alluded to of additional cost, and the weather influencing the amount of consumption. We have also made preparations at the works, by the purchase of new mains and other material, for the increased supply which we expect to render to the public, and which is continually growing. Having told you that we have maintained the quality of our gas, and that we have also reduced the price, I think you will agree with me that we have fairly and fully maintained our side of the bargain which we entered into with Parliament in the year 1860. If anything would have exempted gas proprietors from the continuous attacks which have been made by all sorts of interested people upon their property, I think what I have stated to you ought to place you in that position. They have kept our property in a constant state of depression by a series of attacks which seem to have met with some sort of sanction from Parliament. It is idle to say we have only to begin *de novo*, and lay new mains with all the appliances of science and the experience which we now possess. Such a theory as that could not be seriously mentioned, but I do call upon the proprietors of this and of each company manfully to assert their rights in the same manner as has been done in other companies in which I am a shareholder—namely, the telegraph companies. The Government has come forward and said, "We want to conduct the telegraphs of the country in the same manner as we conduct the Post-Office." The companies have met together—as the Metropolitan Board of Works, or any other board, might do—and what was their reply? "We don't want you to take our property, but if you do you must pay us a fair price for it;" and those companies have obtained, I think, something like 20 years purchase. In the General Act, in regard to the taking possession of railways, it was provided that if Government should take them it should be at 25 years purchase; and I feel pursuaded that if another harassing attack should be made upon us—I hope it may be averted—every company will do as the Western Company did, meet it boldly, and show to the House of Commons that it was wrong so to confiscate their property, and that they could have no right to treat them in any such a manner. If the public have any right of complaint against us, there might be a simple matter of appeal to the Home Secretary, on the ground of our not having fulfilled our obligations entered into with Parliament in 1860. I say, however, that we have fulfilled them, and we defy any one to prove that we have not done do. We say, "Let alone our property; or if it is to be taken from us, then you must pay us an equivalent." Gentlemen, I beg to move that the report and statement of accounts, taken as read, be adopted.

Mr. V. B. CRAKE seconded the motion.

Mr. DOANE asked if the gas companies had agreed upon any scheme of amalgamation, or merely upon the principles upon which it should be carried out. The companies, no doubt, would be glad to rest where they were; but, looking at the agitation which existed, it appeared to him to be important that the question should, if possible, be settled, and that they should be allowed to determine some scheme of amalgamation for themselves. A general election was at hand, and a number of members were always present in the new House for the first time, and it might so happen that some of these who had shown an *animus* towards gas companies, might be relieved from their duties; and, therefore, if they were forced into Parliament it would be so much better than it had been. If he recollected rightly, the ruling of the Board of Trade amounted to this, that if the companies did not settle the terms of amalgamation themselves, there was a compulsory power vested in the Government, who could interfere and compel them to amalgamate. Of course, his observations only applied to any scheme that might interest this company, because it was well known there was an amalgamation contemplated in the City, where the chairmen of the different companies had met together. There was another matter to which he would allude. He wished to know whether this company had procured the leasehold property alluded to at a nominal or a large ground rent.

Mr. DRAKE said that a resolution had been introduced to St. James's vestry by Mr. Beal, and he should be glad to know what the result would be if it was brought into active operation by the various other vestries, who would most likely be applied to to join. It was a very important resolution, and it seemed to carry with it great force at the time it was introduced to his vestry. He found that other vestries had taken the subject up—whether favourably or not he could not say; but he thought it would be a very serious thing if the several vestries in the metropolis were to receive it in the same spirit as it had been at St. James's when brought forward by Mr. Beal.

The CHAIRMAN said he would answer the last question first. A communication had been received from the vestry alluded to, to which the directors of his company had that morning directed a reply to be given, which he would read:—

Western Gaslight Company, Limited,
28, *Argyll St., W., Aug.*, 1868.

Dear Sir,—The directors of this company have had under consideration your letter of the 5th inst., and the vestry's resolutions of the 16th of July, to which you request a reply.

By your communication the inquiry is made whether this company are now willing to do that as regards your parish which the ten companies not supplying gas within the City limits declined to do when before the select committee of the House of Commons—namely, to surrender the rights granted under the Act of 1860, in consideration of the concessions then made to the consumer, and to subject the company to the provisions of the Act of 1868, "as if the latter Act had been extended by Parliament" to this company's district in your parish.

The directors have no alternative but to give a negative reply to this inquiry.

The vestry intimate that, on this reply being given, they will ask the Chartered Company to agree to light this company's division of the parish as well as their own, or to supply gas in bulk, and in the event of a favourable arrangement being effected the vestry will apply to Parliament to sanction it—that is to say, the vestry will endeavour to override the mutual compact between the public and the companies, sanctioned and enforced by the Regulation Act of 1860. That Act, it should be remembered, was obtained by a number of the metropolitan vestries, including St. James's, and provides for the retention by the company of the exclusive supply of their district so long as they observe the conditions specified in the Act—conditions which this company have most honourably fulfilled, and which it is not pretended they have in any way broken.

The object which the vestry have in view is doubtless to cheapen the price of gas throughout the parish. How that result will be permanently secured by the course proposed to be taken has not been and cannot be shown to the vestry, even assuming the improbable condition that the Chartered Company's co-operation and the sanction of Parliament can both be obtained.

Referring to the statement in the resolutions, that by the Acts of this year "the price of gas *is* reduced to 3s. 9d. and the illuminating power raised to 16 candles," I am instructed to point out that this reduction of charge and enhancement of quality are not immediate, but are deferred until the year 1870. Neither are they final; for they are experimental for one year only. If they prove to be such as to prevent the Chartered Company from earning 10 per cent. on their entire share capital (besides the prescribed insurance-fund), revision commissioners are to make such alterations as will admit of that rate of profit; so that, even assuming the price at which the Chartered Company can ultimately supply gas to be a standard to which other companies must conform, that standard has yet to be ascertained.

With regard to the price of this company's gas, looking to the past, the vestry may fairly be asked to give them credit for having acted in a liberal spirit, for it was this company that initiated—freely and without the smallest pressure—the reduced price of 3s. 6d. for 20-candle gas; and this they did without having accumulated any of their authorized reserve-fund. At the present time their price—equivalent to 3·30 "per candle" of light—is as cheap as any in the metropolis, not excepting the two small districts supplied at 3s. 4d. per 1000 feet of common gas. As to the future, whatever price may be ultimately fixed as the minimum at which the Chartered Company can earn their authorized profit, there is nothing to show that this company's charge will be at a higher rate candle for candle.

When these circumstances are taken into consideration, the directors cannot but think it must be evident that the company have given no occasion for unfriendly action, and that any such proceedings as those proposed by the vestry would be premature until the result of the trial working of 1870 is ascertained, and would therefore involve both parties in needless hostilities and expenses, the incurring of which cannot be for the benefit of the consumer.—I remain, dear sir, yours truly,

Geo. Buzzard, Esq., St. James's Vestry-Hall, Piccadilly. S. BARBER, Sec.

That was rather a long letter, but they trusted it would answer the purpose for which it was written. They also hoped that a strong feeling existed amongst the various gas companies faithfully to observe their mutual obligations. In answer to the honourable shareholder's question as to amalgamation, of course the subject had passed through the minds of the directors. What they desired was to be let alone. They said, "We do our duty; you do yours." If they were forced into amalgamation, it would have to receive their serious consideration whether it should be one vast amalgamation north and south of the Thames, or otherwise. In reply to the other question put by the honourable proprietor, he would say there was no scheme matured; the subject had only received their consideration.

Mr. DOANE asked if the Chartered Company were desirous of trenching upon their rights.

The CHAIRMAN said that one of his colleagues and himself had had an interview with the directors of the Chartered Company. They were met in the most honourable manner, and in good faith were told that they should do nothing that would infringe upon the rights of the Western Company. In reply to the question as to the land, he would say they had leased it on terms which he believed were eminently satisfactory. He thought the honourable gentleman would not press the question further than that.

The resolution was then adopted unanimously.

The CHAIRMAN said the next resolution was one which he was sure would not occupy their attention so long as the last one. He begged to move—"That, on the recommendation of the board of directors, a dividend, less income-tax, be, and the same is hereby declared, as follows:—10s. per A share; 6s. per new B share; 6s. per C share; and 1s. per D share; to be paid to the shareholders now appearing on the company's register." He believed that the warrants were prepared, and would be forwarded that afternoon.

Mr. CRAKE seconded the resolution, which was adopted.

The CHAIRMAN said the next business was the election of directors in the places of those who retired by rotation.

Mr. CRAKE had great pleasure in proposing the re-election of Mr. Lightly Simpson.

Mr. GRIFFITHS seconded the motion, which was carried unanimously.

The CHAIRMAN proposed the re-election of Mr. Thomas Wilde Powell.

The resolution was seconded by General Sir H. TAYLOR, and unanimously adopted.

The CHAIRMAN next proposed, and Mr. EDWARDS seconded, the re-election of Mr. William Thomas Makins. Adopted *nem. con.*

Mr. Thomas James Briggs was reappointed auditor on the motion of Mr. GRIFFITHS, seconded by Mr. WOOD.

This concluded the business of the meeting, and a vote of thanks having been accorded to the chairman and directors on the motion of Mr. MAUGHAN, the meeting separated.

BRIGHTON GASLIGHT AND COKE COMPANY.

The Ordinary Half-Yearly Meeting of the Proprietors of this Company was held at the Office, 13, St. Swithin's Lane, London, on Thursday, Aug. 27—HENRY WHEELER, Esq., in the chair.

The SECRETARY (Mr. Arthur Weare) having read the advertisement convening the meeting, and the minutes of the half-yearly meeting held in February last, the seal of the company was affixed to the register of proprietors.

The following report and statement of accounts were taken as read:—

The directors have the pleasure of reporting a further increase in the sale of gas during the past half year, and they believe that increase would have been somewhat greater but for the unusually warm and bright weather which prevailed during the months of May and June. The sale of coke has also been more productive than in the corresponding half year of 1867.

The examinations made on the part of the town authorities continue to furnish satisfactory evidence of the illuminating power and purity of the company's gas. With a view to sustain its high character for the future, as well as to provide for an increasing demand, some additions and improvements are being made in the purifying department, and will, it is hoped, be ready for the ensuing winter.

The directors recommend the declaration of a dividend for the half year ending the 24th of June last at the rate of 7 per cent. per annum on the paid-up capital of the company, free of income-tax, the same to be payable on and after the 7th of September next.

Dr. *Profit and Loss Account, for Half Year ending June 24, 1868.* *Cr.*

To Coals	£7,658	12	6	By Gas and meter rental	£12,147	8	11
Materials for purification	252	14	0	Coke, &c.	2,690	19	8
Wages	1,406	11	9	Sundries	29	6	0
Rent, rates, and taxes	220	0	0				
Salaries, collectors commission, directors and auditors	1,238	6	6				
General charges	180	6	4				
Wear and tear	1,068	17	0				
Bad and doubtful debts and allowances	116	16	3				
Interest on debentures	75	0	0				
Balance	2,650	10	3				
	£14,867	14	7		£14,867	14	7

Dr. *Balance-Sheet, June 24, 1868.* *Cr.*

To Capital	£75,600	0	0	By Expended on works	£72,701	2	9
Debentures	3,000	0	0	Meters	2,160	1	3
Contingency-fund	4,470	12	6	Coal, coke, &c., in stock	4,344	19	0
Depreciation account	1,689	9	11	Mains, service-pipes, and general stores in stock	1,314	14	9
Coal insurance account	885	10	0	Sundry debtors for gas	6,078	2	5
Dividends unpaid	824	16	3	Ditto ditto for coke, &c.	1,259	15	1
Interest on debentures	56	18	10	Cash at bankers and in hand	2,335	1	9
Tradesmen's accounts, &c., owing	980	3	11				
Balance from last half year	£35 15 4						
Ditto this half year, as above	2,650 10 3						
	2,686	5	7				
	£90,193	17	0		£90,193	17	0

The CHAIRMAN moved the adoption of the report, saying that he had no observations to offer in regard to the affairs of the company, but would be happy to answer any questions that might be addressed to him.

The motion having been seconded, was put, and carried unanimously.

On the motion of the CHAIRMAN, the dividend recommended in the report was agreed to.

A vote of thanks was given to the directors for their continued attention to the affairs of the company, and the CHAIRMAN acknowledged the compliment.

A vote of thanks was given to the auditors, and duly acknowledged.

A vote of thanks was also given to Mr. Rutter, the engineer, and the other officers of the company, which was acknowledged by the SECRETARY, and the proceedings terminated.

THE ALUM AND AMMONIA COMPANY, LIMITED.

The Eighth Ordinary Meeting of the Shareholders in this Company (late the Gas Products Utilizing Company, Limited) was held at the London Tavern, Bishopsgate Street, on Friday, Aug. 28—A. A. CROLL, Esq., in the chair.

The SECRETARY (Mr. T. Guyatt) read the advertisement convening the meeting, and also the following report of the directors:—

The directors have much pleasure in again meeting the shareholders, and placing before them a statement of their affairs at the 30th of June last.

The result of the company's operations for the six months ending the 30th of June last shows a profit of £4756 4s. 3d., which added to the amount of undivided profits gives a balance of £7738 11s. 11d.

From this sum the directors propose, in accordance with the resolution of the shareholders, to write off the balance of the loss upon the disputed contract referred to in their last two reports, and they are pleased at being able to close this account, so that it will not appear in future balance-sheets.

The balance available for division is £6818 11s. 11d., and will enable the directors to pay the usual dividend at the rate of 10 per cent. per annum, free of income-tax, which they accordingly recommend, and will leave the amount of undivided profits at £3615 0s. 3d.

The works at Hurlet are now in effective and profitable working condition, and had it not been for the contract for tar and ammoniacal liquor at the West Street works, taken over from Messrs. J. Wilson and Sons, the result of the operations at Glasgow would have shown a much more favourable result.

The directors, however, are now in negotiation with the Glasgow Gas Company, which it is hoped will lead to a modification of the present contract.

The CHAIRMAN: Gentlemen, I have great pleasure in moving that the report now submitted to you be received and adopted. The report is certainly very short, but I have no doubt you will consider it perfectly satisfactory. This is the eighth time we have had the gratification of meeting one another in general meeting, and on the present occasion, our business being of a very simple character, I do not know that I have anything to add to the report. At the same time I need not say how pleased I shall be to answer any questions which may be put to me by the shareholders. There is, however, one paragraph in the report upon which I might say a word, and that is with reference to the contract entered into with the Glasgow Gas Company. When we purchased our works at Glasgow we took over with them a contract entered into for ten years by Messrs. Wilson with the gas company. At that time the price of naphtha was 1s. 8d. per gallon, and the price of pitch and other products was correspondingly high, as also was the price of sulphate of ammonia. Unfortunately the price of these articles has been very low for a long time, but there now appears a good prospect of a rise in the market value of some of them. This is the unfortunate circumstance alluded to in the report, and had it not been for this contract and our works at West Street we should have had a profit very much larger than we have. Looking, however, at the other side of the question, I may state that the Hurlet works are in a very satisfactory condition, and likely to go on increasing the profits of the company to a material extent. Should we, therefore, succeed in getting a modification of our contract, which we think not at all unlikely, we shall have still more pleasing results to lay before you when we meet again. As regards the other operations of the company, I would merely say that nothing could be in a better and more healthy condition. With these remarks, I beg to move that the report and accounts be received and adopted.

Lord ALFRED S. CHURCHILL seconded the motion.

Mr. STARLING said he had been very much gratified to receive such a report as the directors had that day been enabled to lay before the meeting. On former occasions the accounts had shown so large an amount of undivided profit, that he had always felt it would be good policy on the part of the directors to appropriate some portion of that fund in the shape of bonuses among the proprietors. The depressed state of trade throughout the country, however, during the last two years had led him to a somewhat different conclusion, and he was now of opinion that it was safer, in the interest of companies generally, that the directors should not divide to the full extent, in the shape of dividends or bonuses, the profits realized from time to time. For a company to have a moderate reserve of undivided profits was, he believed, the best guarantee to permanent investors, and also for maintaining the market value of the shares. As a small shareholder in this undertaking, he felt highly gratified that, after four years trading, the directors could give the proprietors so large a dividend and yet make such a reserve to meet future contingencies. It spoke very highly for the careful administration of the company's affairs.

The CHAIRMAN said he might remind the last speaker that the undivided fund of £2615 existed after writing off the whole of the large loss referred to on former occasions. He entirely concurred in the observations addressed to the meeting as to the maintenance of a reserve-fund, for he felt convinced that it was better for the permanent interests of the company to have a stereotyped dividend of 10 per cent., which nothing could interfere with, than to divide large profits on one occasion with the chance of small profits on the next.

The AUDITOR remarked that, in going through the accounts, he had been much pleased with several features in them. One was that the greater part of the money expended upon works during the half year had been written off revenue, a small amount only, which was for absolute extensions, being charged to capital. Another thing was that the stock account showed a very material reduction in amount during the same period. These two points were very important, and he was sure the proprietors would be gratified to have them mentioned.

The CHAIRMAN, in explanation of the first remark of the last speaker, said the directors kept an account, called a "maintenance account," for the purpose of maintaining the whole plant of the company in its integrity, so that at the end of every year it was in as good, if not in a better, condition than it was at the commencement. As an instance, he might mention that there had been debited to revenue on account of the maintenance of the Bow works, during the past twelve months, nearly £1000. The directors might, of course, if they had desired to present a more flattering report, have charged this to some other account, and thus shown a proportionate increase in the profits of the half year.

The motion for the adoption of the report and accounts was then put, and carried unanimously.

The CHAIRMAN stated that the dividend warrants had been prepared as usual, so that the proprietors present might receive them as they retired.

On the motion of Mr. POTTER, seconded by Mr. BRADING, a cordial and unanimous vote of thanks was presented to the chairman and directors for their successful management of the company's business.

The CHAIRMAN acknowledged the vote, and expressed a hope that they would have many opportunities of meeting the proprietors under circumstances as favourable as those of the present time. He also took occasion to refer to the valuable services of Mr. Guyatt, the secretary, and mentioned an instance in which the ability and energy of that officer had been instrumental in securing a valuable contract for the company. Mr. Guyatt's constant attention to duty, and his politeness to every one who had business relations with the company, were too well known to need comment, and therefore he would at once propose that the best thanks of the proprietors be presented to him on the present occasion.

The AUDITOR said he had very great pleasure in seconding the motion, because his official connexion with the company furnished him with the opportunity of observing the ability with which the duties of the secretary were performed. Scientific book-keeping was, in fact, a household word with Mr. Guyatt, and the accounts of the company gave evidence of the care and attention which he constantly bestowed upon them. Every detail connected with them he had at his fingers ends, and this circumstance, added to the affability with which he always furnished information, made the audit of the accounts a source of pleasure and satisfaction.

The motion was very heartily responded to, and the secretary appropriately acknowled his obligations.

Mr. BUSS said he had not hitherto taken any part in the proceedings, but he did not like the meeting to separate without expressing his entire satis-

faction with the report which had been read, and his confidence in the efficient manner in which the affairs of the company were conducted.

A vote of thanks to the auditor, which was duly acknowledged, terminated the proceedings.

GAS COMPANIES AND STREET PAVEMENTS.—We think it may now be regarded as finally settled by the decision of Vice-Chancellor Malins, in *Attorney-General v. Cambridge Gas Consumers Company*, that the breaking up of the streets of a town without parliamentary authority, for the purpose of laying down gas-pipes, is such a public nuisance as will be restrained by injunction at the suit of the Attorney-General. Few, probably, of our readers—at any rate of those who live in paved and lighted regions—will regret that the Vice-Chancellor should have arrived at this decision; yet, inasmuch as the full court of appeal came to a contrary conclusion in *Attorney-General v. Sheffield Gas Company* (3 D. M. & G. 307)—a case in many respects upon all fours with the Cambridge case—we do not wonder that the defendants in the latter case should have proceeded with so much confidence, and have expressed so much disappointment at the issue. Still the cases are distinguishable, and the state of public feeling has, no doubt, undergone a change with respect to the nuisance occasioned by gas companies disturbing the streets since the year of the Sheffield decision; and we take it, on the authority of Lord Cottenham, that the Court of Chancery, like every other institution, must accommodate itself to the demands of the age. We cannot, therefore, regret that another precedent has been established for the interference of the court with nuisances of this description. —*Solicitor's Journal.*

BOLTON.—The half-yearly meeting of shareholders in the Bolton Gas Company was held on Friday, the 28th ult.—Mr. Thomas Moserop in the chair. The report of the directors stated that the expenditure on capital account during the past six months had been £2842 14s. 2d., of which £1968 11s. 8d. was on further account of erection of new offices, and £838 2s. 6d. for extension of mains. The total expenditure had been diminished by the proceeds of sale of surplus apparatus amounting to £107, and £418 10s. from the sale of a portion of land in Spa Fields. The revenue account showed a continued increase in the gas-rental, but there had been a large decrease in the returns from the sale of tar. The half-yearly profits amounted to £6194 12s. 7d., of which sum the dividend would require £6136 13s. 3d., leaving £57 19s. 4d. to be added to the reserve-fund. The new premises in Hotel Street would be opened for the transaction of business in a few days. On the motion of the chairman, the report was adopted, and a dividend at the rate of 10 per cent. per annum on the old shares, and 6½ per cent. on the paid-up capital of the new shares, free of income-tax, was declared.

Share List of Metropolitan Gas Companies.

Number of Shares issued.	Amount per Share.	Name of Company.	Amount paid up p. Share.	Dividend p. Cent. p. Annum.	Price per Share.
	£		£ s. d.	£ s. d.	£
8000	10	Anglo-Romano	10 0 0	10 0 0	11 — 12
5000	20	Bahia (Limited)	20 0 0	3 0 0	14 — 15
1000	20	Do., preference	20 0 0	10 0 0	20 — 22
750	20	Do., do., redeemable	20 0 0	10 0 0	20 — 21
40000	5	Bombay (Limited)	5 0 0	4 10 0	3½ — 4
10000	5	Do., third issue	3 0 0	4 10 0	1½ — 2
10000	20	British (Limited) (Norwich, Hull-Sculcoates, Hanley, Tunstall & Shelton [Potteries], Trowbridge, & Holywell.)	20 0 0	10 0 0	28 — 29
12000	50	*Chartered*	50 0 0	7 0 0	51 — 52
6000	50	Do.	45 0 0	7 0 0	45 — 46
10000	20	*City of London*, A shares	20 0 0	9 0 0	22 — 24
10000	10	Do., B shares	10 0 0	4 0 0	6 — 6½
9629	10	Do., new shares	10 0 0	9 0 0	11 — 12
25000	25	City of Moscow (Limited)	25 0 0	nil.	5½ — 6½
17490	25	*Commercial*	25 0 0	10 0 0	34 — 36
20000	20	Continental Union	20 0 0	4 0 0	15½ — 16½
10000	20	Do., preference	20 0 0	7 0 0	20 — 20½
5000	10	*Crystal Palace District*	10 0 0	10 0 0	14 — 15
5000	10	Do., preference	10 0 0	6 0 0	12½ — 13
10000	10	Do., new shares	2 10 0	7 0 0	2½ — 3
4000	50	*Equitable*	50 0 0	10 0 0	65 — 67
4000	25	Do., new shares	25 0 0	10 0 0	32½ — 33½
23406	10	European (Limited)	10 0 0	11 0 0	15 — 15½
12000	10	Do., new shares (Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	5 0 0	11 0 0	7½ — 7¾
20000	10	*Great Central Gas Consumers*	10 0 0	10 0 0	14 — 14½
5000	10	Hong Kong (Limited)	10 0 0	5 0 0	8 — 10
26000	50	*Imperial*	50 0 0	10 0 0	67 — 69
26000	10	Do., new shares	1 0 0	10 0 0	1¾ — 2
26000	12½	Do., new shares	3 0 0	7 0 0	3 — 3¼
1300	100	Do., bonds	£100	10 0 0	170 —175
28000	50	*Imperial Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwerp, Bordeaux, Brussels, Cologne, Frankfort-on-Maine, Haarlem, Stolberg, Toulouse, & Vienna.)	43 15 0	16 0 0	99¼—100

Number of Shares issued.	Amount per Share.	Name of Company.	Amount paid up p. Share.	Dividend p. Cent. p. Annum.	Price per Share.
	£		£ s. d.	£ s. d.	£
400	100	Imperial Mexican (Limited)	100 0 0	nil.	
300	100	Do., new	100 0 0	nil.	
3000	40	*Independent*	40 0 0	10 0 0	52 — 53
3000	10	Do.	10 0 0	5 0 0	7 — 9
3000	20	Do.	12 10 0	7 10 0	13 — 14
7133	50	*London*	50 0 0	10 0 0	64½ — 65
5610	25	Do., 1st preference	25 0 0	6 0 0	26 — 27
503	50	Do., 2nd preference	50 0 0	6 0 0	
214	50	Do., 3rd preference	50 0 0	6 0 0	
£18781		Do., 1st preference stock		6 0 0	
£11828		Do., 2nd preference stock		5 0 0	
12000	5	Malta and Mediterranean (Limited)	5 0 0	5 0 0	3½ — 4
6000	5	Do., preference	5 0 0	7 0 0	— — 5
30000	5	Oriental (Calcutta)	5 0 0	9 0 0	6¾ — 7¼
30000	5	Do., new shares	1 0 0	9 0 0	1¼ — 1½
10000	5	Ottoman (Limited)	5 0 0	nil.	1¾ — 2¼
10000	10	Pará (Limited)	10 0 0	6 0 0	8½ — 9
27000	20	*Phœnix*	20 0 0	10 0 0	28 — 29
3600	100	Do., new	35 0 0	7 10 0	36 — 37
144000	Sk.	Do.	100 0 0	5 0 0	72 — 74
5000	20	*Rateliff*	20 0 0	10 0 0	23 — 24
	20	Rio de Janeiro (Limited)	20 0 0	10 0 0	23 — 25
6959	5	Singapore (Limited)	5 0 0	4 0 0	
2000	5	Do., preference	5 0 0	7 10 0	
		Shanghai			
4800	50	*South Metropolitan*	50 0 0	10 0 0	70 — 72
	12½	Do., new shares	12 10 0	10 0 0	17½ — 18
15000	10	*Surrey Consumers*	10 0 0	10 0 0	13 — 13½
10000	10	Do., new	6 0 0	10 0 0	8 — 8½
9000	5	United General (Limerick)	5 0 0		2 — 2½
10000	10	*Victoria Docks*	5 0 0	6 0 0	
1500	10	*Wandsworth and Putney*	10 0 0	10 0 0	10 — 12
2989	10	Do.	10 0 0	7 10 0	10 — 10½
316	10	Do.	6 10 0	7 10 0	
1128	10	Do.	3 0 0	7 10 0	
20000	10	Western (Limited) A shares	10 0 0	10 0 0	14 — 15
10000	10	Do., B shares	6 0 0	10 0 0	8 — 8½
10000	10	Do., C shares	6 0 0	10 0 0	8 — 8½
20000	10	Do., D shares	1 0 0	10 0 0	1½ — 2
8000	5	*West Ham*	5 0 0	7 10 0	.. — 7¼
6000	5	Do., new shares	5 0 0	7 10 0	.. — 7¼
551	10	West London Junction (Limited)	10 0 0	6 0 0	
520	10	Do., preference	10 0 0	6 0 0	

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1 (g.m.b.)	3 12 6	2 13 0	2 6 6	3 5 0	3 5 0
1¼ and 2-inch Socket-pipes	7 10 0	6 0 0	6 15 0	6 15 0	7 10 0
2½ and 3-inch ditto	7 0 0	6 0 0	6 5 0	6 10 0	7 0 0
4 and 5-inch ditto	6 10 0	5 10 0	5 15 0	6 0 0	6 10 0
6 inches and upwards ditto	6 5 0	5 0 0	5 10 0	5 15 0	6 5 0
Retorts, 1st fusion, hot blast	6 0 0	—	5 5 0	5 10 0	6 0 0
Ditto, 2nd ditto, cold ditto	7 0 0	5 15 0	5 15 0	6 0 0	7 0 0
Tank-plates, ¾ thick and above	6 10 0	5 10 0	5 10 0	5 15 0	6 5 0

WROUGHT-IRON TUBING,

Subject to 50 per cent. Discount.

	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 feet—per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto ditto, from 6 inches to 18 inches—each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows (wrought iron)	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, ditto	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2-quart	15 0	14 0	13 6	13 0	12 0	—

GAS COALS.—*Per Ton.*

Newcastle.—Unscreened:—

Haswells, Nettlesworth Primrose, and South Pelaw	6s. 6d.
Felling, Framwell Gate, North Pelton, Redheugh Main, Walker's Primrose, West Wear, and Whitwell Primrose	6 9
Burnhope, Craghead, Charlaw, Derwent, East Castle, Edmondsley, Eighton Moor, Hartlepool Pelaw, Holmside, Lambton's Gas, Lanchester Pelaw, Medomsley, Mickley, New Pelaw, Pelaw Main, Ravensworth, Seaham, South Moor Pelton, South Leverson, Townley Main, Tyne Main, West Pelaw, Wearmouth Hutton, and Witton	7 0
Pearth, Ravensworth Pelaw, Waldridge, West Garesfield, and West Pelton	7 3
Brancepeth, Dean's Primrose, Londonderry Gas, New Pelton, Pelton, South Pearth, Stella, Urpeth, Washington Hutton, and West Leverson	7 6
Ramsay's Newcastle Cannel	15 0
Wigan Cannel (at Liverpool)	17 0
Scotch Cannel:—	
Boghead (at Leith)	42 6
Mairkirk	27 0
Kirkness, best (at Burntisland)	28 6
Capeldrae, 1st quality (at ditto)	28 6
Ditto, 2nd ditto (at ditto)	18 6
Cowdenbeath	12 0
Lesmahago (at Glasgow)	31 6
Ditto (at Granton)	32 6
Arniston	27 6
Wemyss (f.o.b.)	22 6
Haywood, Wilsontown (at Granton)	23 0
Pirnie, or Methill	17 0
Lothian's Cannel (at Leith)	28 0
Myles' Cannel	23 6
Lochore Parrot (at Burntisland)	28 0
Lanemark (at Glasgow)	16 0
Elphinstone Tower (at Leith)	20 0
Coppa Cannel (on rails at Birkenhd.)	14 9
Ditto ditto (ditto at Connah's Quay)	14 3

FREIGHTS.

Coastwise—Newcastle.—Per Ton:—

Chatham and Rochester	5s. 3d. to 5 6
Cork	7s. 6d. to 8 0
Dover, Folkestne, & Ramsgate	6 0
Dublin	8s. to 8 6
Exeter Quay	7 6
Ipswich	4 6
London (from Leith)	7s. 6d. to 8 0
London (Pool)	5s. 4½d. to 5 6
Lowestoft and Yarmouth	4 6
Portsmouth & Southampton	6 3
Plymouth	6s. 9d. to 7 —
Shoreham	6 0
Whitstable	5 6
Weymouth	6 6
Foreign.—Per Keel:—	
Barcelona	£17 10
Bordeaux	11 10
Boulogne and Calais	6 5
Cadiz	14 0
Cronstadt	—
Copenhagen	9 0
Genoa	16 10
Hamburg	7 10
Havre de Grace	7 15
Leghorn	16 10
Lisbon	13 0
Rotterdam	6 17 6
Stettin	10 0
Trieste	18 0
Venice	18 10

SUNDRIES.

Best Nstle. Fire-bks., p. 1000, £2 10s. to £2	15 0
Cliff's Fire-bks. (at Wortley), p. 1000	2 15 6
Ingham's ditto (at Wortley), p. 1000	2 15 0
Farnley Iron Co.'s Fire-bks. (at Wortley), less discount	2 17 0
Fire-clay Retorts, p. ft. run, 8s. 6d. to	0 7 0
Tough Cake Copper, p. ton	73 0 0
English Pig Lead, p. ton	18 15 0
Welsh Bar Iron (in London), p. ton	6 7 6
Foreign Spelter, p. ton	20 0 0
English Block Tin, p. ton	96 0 0
Banca, p. ton	94 0 0
Tarred Rope Yarn, p. cwt.	1 0 0

C. A. S. VICKARY,

(ADMINISTRATRIX TO THE LATE JOHN VICKARY,)

GAS ENGINEER AND CONTRACTOR, IRON AND BRASS FOUNDER,

EXE ISLAND, EXETER,

Tenders her best thanks to the various Gas Companies in **England, Ireland, and Wales,** for the very liberal and kind support received by her lamented husband for the last **22 years,** during which period he erected and extended more than **200 Gas-Works.** She respectfully solicits a continuation of that support, and begs reference to the following testimonial:—

Plymouth and Stonehouse Gaslight Company.

Sir,—I have much pleasure in testifying that the 100-foot Telescope Gasholder and Cast-Iron Tank, erected by you for this Company in 1862, has given the highest satisfaction, and never required the slightest alteration or adjustment since its completion.

Mr. John Vickary. (Signed) PETER ADAMS, Chairman.

The late Mr. Vickary also erected a 100-foot Gasholder and Cast-Iron Tank at **Exeter;** an 80-foot Telescope Gasholder and Iron Tank at **Devonport;** a 90-foot at **Torquay,** &c., &c. At either of these works satisfactory references can be made.

C. A. S. V. begs particular attention to her **Improved Gas-Meters,** both **Wet and Dry,** the materials and workmanship of which are guaranteed of the very best description, and which have gained for her Meters so excellent a reputation.

RETORTS, DIP & ASCENSION PIPES, HYDRAULIC MAIN, CONDENSERS, PURIFIERS, STATION-METERS, GOVERNORS, VALVES, and GASHOLDERS,

Of any size, and every description of article required in Gas-Works supplied.

Mains, Tees, Connexions, and Syphons, from 2 to 12 in., always in stock, and supplied at Scotch prices.
Clay Retorts and Fire-Goods of every description.
Chandeliers and Gas-Fittings of the most modern designs.
Iron Pipe and Fittings, Service Cocks, &c.

Plans, Specifications, and Estimates for the Erection of New Gas-Works of any size furnished.

EDGE'S AMERICAN PATENT METHOD FOR SCURFING RETORTS.

The above improved method having been found to be the most efficacious, expeditious, and economical of any plan at present employed for the removal of the Incrustation from the interior of Retorts, arrangements have been made with the Patentee for working the patent in this country. Particulars and Terms for Licences may be had on application to

E. GODDARD, GAS-WORKS, IPSWICH,

Where the process may be seen in full operation.

THE FARNLEY IRON COMPANY,

FARNLEY, near LEEDS,

In consequence of the increasing demand for their Retorts, have largely extended this branch of their Fire-Clay Works, and are now prepared to execute the most important orders, either for *home* or *export*, with great punctuality.

The Fire-Clay raised from the Farnley Estate (commonly called the Wortley bed) is unsurpassed by any other known in the district, and is peculiarly well adapted for Retorts, Gas-Ovens, and Fire-Bricks; and the F. I. Co. beg especially to invite those connected with Gas-Works, who have not yet used their Retorts, to be good enough to favour them with a trial.

The F. I. Co. generally hold in stock, for immediate supply, Fire-Bricks of every size and kind—Tiles, Sanitary Tubes, Ornamental Terra-Cotta Ware White Facing Bricks, the White, Buff and Salt-Glazed Bricks, &c., &c.

Prices, Drawings, and all other information may be obtained by applying as above, or to

MR. SUTTON, THE HULL STORES, 46½, QUEEN STREET, HULL.

ECONOMY IN GAS PURIFICATION.

Mc DOUGALLS'

HYDRATED PEROXIDE OF IRON.

This Oxide is now well known, and has gained at a number of the largest gas-works at home and abroad a decided preference for efficiency and durability. It is free from any mixture of sawdust or other material, every particle being available for use, thus causing the Purifiers to work double the time before it requires renewing, and saves one-third the cost of labour in charging them. It readily takes up sulphur, revivifies rapidly, and lasts longer than any other Oxide in the market. Prices on application to—

Mc DOUGALL BROTHERS, Manufacturing Chemists,

LONDON—11, Arthur Street West, London Bridge, E.C.; MANCHESTER—Riga Street, Shudehill.

TO GAS COMPANIES.

WANTED, by the Advertiser, a situation as Manager of a country gas-work, or Sub-Manager of a large work, in England or abroad. He has had many years experience in the extensive gas-works of London, and is therefore competent to take the entire management of the post he now seeks. Can produce testimonials to that effect.

Address C. D., 54, Great Percy Street, Pentonville, LONDON, W.C.

WANTED, by the Advertiser, who has had considerable experience in the erection and management of gas-works, a situation as MANAGER of a gas-work, either at home or on the Continent. Good references.

Apply E. S., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a re-engagement as MANAGER of gas-works. Can fix retorts, lay mains and services, fix meters, and take indices. Thoroughly understands all the general duties required in a gas-work. Age 30, married, no children. No objection to go abroad. Good references.

Address W. HARDY, Gas-Works, Walton-on-Thames, SURREY.

WANTED, a situation as Gas-Fitter, by a good workman. Good references given.

Address JAS. HOLLOWAY, 17, Burn Street, Ormond Street, Chorlton-on-Medlock, MANCHESTER.

TO GAS COMPANIES.

WANTED, by the Advertiser, a situation as STOKER. Has filled a similar situation in a large gas-work, and can be well recommended.

Apply to JAMES SMITH, Gas-Works, Swindon, WILTS.

TO GAS COMPANIES.
MANAGER AND SECRETARY,

THE Advertiser is desirous of obtaining a re-engagement in the above capacity. Seven years in last situation. Good testimonials.

Address B. N., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TUNBRIDGE WELLS WATER-WORKS.

THE Water-Works Committee of the Tunbridge Wells Local Board require the services of a FOREMAN who can joint and otherwise superintend the laying of mains, services, &c. For further particulars apply to Mr. Joyner, Engineer's Office, Town Hall. Salarly £1 1s. per week, with house and garden.

Applications, with references, &c., to be sent in on or before the 29th inst., endorsed "Application for Foreman." JOHN ELLIOTT,
Clerk to the Local Board.

THE Directors of the Phœnix Gas-light and Coke Company are prepared to receive TENDERS for constructing certain Timber and Tile ROOFING, supported by iron columns, &c., at their Bankside station. Plans and specifications may be seen upon application to their Engineer.

Tenders, marked "Tenders for Roofing," to be delivered to the undersigned on or before the 9th prox. at Twelve o'clock noon.

The Directors do not bind themselves to accept the lowest or any tender.—By order,
J. A. CROOKENDEN, Secretary.
70, Bankside, S.E., Aug. 27, 1868.

THE Directors of the Phœnix Gaslight and Coke Company are prepared to receive TENDERS for the supply of about 300 tons of natural or manufactured OXIDE PURIFYING MATERIAL, to be delivered at their Vauxhall or Greenwich stations, as may be directed.

Tenders, to be marked "Tenders for Purifying Material," to be sent in on or before the 9th proximo, at Twelve o'clock noon.

The Board do not bind themselves to accept the lowest or any tender.—By order,
J. A. CROOKENDEN, Secretary.
70, Bankside, S.E., Aug. 27, 1868.

WATER DISTRIBUTOR FOR SCRUBBER USE.

MESSRS. PETER EDDLESTON and Company, of Pioneer Iron-Works, ACCRINGTON, find that they are now enabled to supply their PERFECT SELF-MOVING WATER DISTRIBUTOR for Scrubber use to Gas Companies for the sum of £5 5s., delivered at Accrington Railway Station.

COAL TAR.

THE Directors of the City of London Gaslight and Coke Company hereby give notice that they are prepared to receive TENDERS for all the COAL TAR (or a portion thereof not less than a moiety) made on their works, Dorset Street, Salisbury Square, for One year from Michaelmas next. The Tar to be removed as required by the Company, and will be loaded into the Contractor's barges at the works, or, should the navigation of the River Thames be from any cause interrupted, into his waggon. Payment in cash monthly, within one week after the account shall have been delivered. The quantity made is about 5000 butts per annum, weekly quantities from 46 to 190 butts.

The Directors do not bind themselves to accept the highest or any tender, and reserve to themselves the right of being satisfied as to the competency of any party tendering to perform the contract.

No tender will be received after Ten o'clock a.m. of the 11th proximo.—By order,
R. J. MILLAR, Secretary.
Dorset Street, E.C., Aug. 31, 1868.

SWANWICK CANNEL COAL.— The attention of Gas Companies is called to the following analysis of the Swanwick Cannel Coal by William Fiddes, Esq., Bristol.

Analysis of Swanwick Cannel Coal.

Specific gravity of the Coal	1·271	
Fixed products	54·750	per ct.
Volatile products	41·750	,,
Sulphur in the Coal	1·318	,,
Ash in the Coal	3·500	,,
The quantity of purified gas per ton was	10,051	cub. ft.
Sulphuretted hydrogen in the crude gas	1·39	per ct.
Carbonic acid in ditto	3·58	,,
Matter condensable by bromine in the purified gas	11·20	,,
Carbonic oxide ditto	6·50	,,

The illuminating power of the gas, when burned in a bat's-wing burner at the rate of 4 cubic feet per hour, was equal to a light of 20·15 spermaceti candles, each burning 120 grains per hour.

The heating power of the Coal is 13·75, or 11lb. of this Coal, by its perfect combustion, will convert 13·75 lbs. of boiling water into steam.

Ultimate Analysis.

Carbon	74·346	per cent.
Hydrogen	6·285	,,
Oxygen	14·201	,,
Nitrogen	0·350	,,
Sulphur	1·318	,,
Ash	3·500	,,
	100·000	,,

WILLIAM FIDDES, F.C.S.
Gas-Works, Bristol, May 28, 1868.

All orders to be addressed to Mr. HENRY BOAM, Head Office, 1, Darwin Terrace, DERBY.

SWANWICK CANNEL COAL.— The following analysis of this Coal has been made and reported by W. Valentin, Esq., of the Royal College of Chemistry, London:—

Chemical Composition of Coal.
(Mean of two well concordant experiments.)

	In 100 parts.
Water given off at 212° Fahr.	5·80
Carbon	73·90
Hydrogen	5·00
Oxygen	9·05
Nitrogen	1·41
Sulphur	1·47
Ash (white)	3·37
	100·00

Coke—53·3 per cent.

Ash in coke	6·72
Combustible carbonous matter	93·28
	100·00

Volatile carbonous matter (inclusive of 5·8 per cent. of water, of 1·41 per cent. of nitrogen, and part of the sulphur in the coal)	46·70
Fixed carbonous matter left in the coke	49·93
Ash	3·37
	100·00

The Coal yielded 11,200 cubic feet (per ton) of gas, the average of four distillations, conducted at the experimental gas-works of the Chartered Gas Company, at Horseferry Road, Westminster.

The quality of the gas was very good; burnt by means of the usual standard bat's-wing burner, consuming 5 cubic feet of gas per hour, its mean illuminating power, deduced from thirty trials, was found to be equal to that of 23·98 candles, the candles consuming 120 grains of sperm per hour.

The coke which was left was of the same compact nature as the Coal itself. The small per centage of ash raises its value much above that of the coke obtained from the ordinary Cannel Coal.

The coke will form a good fuel when mixed with other more porous coke, or by itself, in a smith's fire. Thus the objection generally raised by gas companies with respect to coke from Cannel Coal will scarcely apply to this coke.

My opinion, based upon the results of my analysis, is that *this Cannel Coal is a very valuable Coal for gas purposes*, and that it will find a ready market.

(Signed) W. VALENTIN,
Aug. 3, 1865. Sen. Assistant.

All orders to be addressed to Mr. HENRY BOAM, Head Office, 1, Darwin Terrace, DERBY.

OLD WEMYSS CANNEL COAL.— Yield of gas per ton, 12,896 cubic feet; illuminating power, 31·75 standard candles. Port of shipment, Wemyss.

Analysis and price on application to Mr. WM. CAREY, Manager, Wemyss Colliery, Kirkcaldy, FIFE.

CANNEL COAL.—The West York-shire Iron and Coal Company, Limited, beg to draw the attention of Gas Companies to their Cannel, of which the following is the analysis made by W. Huggon, Esq., F.C.S.:—

Yield of gas per ton	10,296 cubic feet.
Illuminating power rather over	21 sperm candles.
Yield of coke per ton	12 cwt.

The actual working, as reported by one of the largest gas companies in Yorkshire, gives results still more favourable, viz—

Yield of gas	10,416 cubic feet.
Illuminating power	21·89 sperm candles.
Coke	The same.

We add from the same source the capabilities of the common gas coal—

Yield of gas	10,080 cubic feet.
Illuminating power	14·41 sperm candles.
Yield of Coke	13 cwt.

COLLIERIES—WEST ARDSLEY, near LEEDS.

For further particulars, address to the Office of the Company, 15, York Place, LEEDS.

TENDER FOR GAS COAL.

THE Directors of the Commercial Gas Company will meet on Friday, the 4th day of September next, to receive TENDERS for the supply of 60,000 tons of the best GAS COAL. Further particulars can be obtained by letter to the Company's engineer.

Tenders, to be addressed to the Secretary, and endorsed "Tender for Coal," to be delivered at the Company's Office before Ten o'clock on the 4th of September next.

The Directors do not bind themselves to accept the lowest or any tender.

By order of the Directors,
GEORGE JAQUES, Secretary.
Stepney, London, Aug. 18, 1868.

TO EXPORTERS OF GAS COAL.

THE PATENT GAS COAL yields 13,800 feet of 32-candle gas, saves 33 per cent. in lime purification, and yields a good coke. Shipped, f.o.b., Rotterdam, at 23s. per ton.

Apply to HAMILTON, DULLENS, and Co., DORDRECHT, Patentees for England, France, Holland, Denmark, and Germany; or to their London Agents, WARNER, WALDUCK, and Co., 11, OLD JEWRY CHAMBERS.

CANNEL COAL.

MESSRS. GRIFFITHS BROTHERS,
COPPA COLLIERY, MOLD,
Beg leave to call the attention of Gas Companies to the superior quality of their Cannel for gas-making purposes.

This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.

Ports of shipment—Birkenhead or Connah's Quay.

Waggons supplied for delivery by railway to any part of England or Wales.

For particulars, prices, and rates of freight, apply to GRIFFITHS BROTHERS, Coppa Colliery, Mold, FLINTSHIRE.

LAMP-POSTS—Plain & Ornamental.
DWARF GAS-PILLARS—Do., do.
LAMP-BRACKETS—Do., do.
LAMPS, in Copper, Tin, and Iron—Do., do.
NUMBERS for STREET-LAMPS.
FOUNTAINS—Garden and Drinking.
VASES—for Gardens, Terraces, &c.

A Book of the newest DESIGNS for these will be forwarded free on receipt of 3s. 6d. in stamps, which will be allowed on first order.

TURNER AND ALLEN,
Founders & Contractors,
201, UPPER THAMES STREET, LONDON.

B. CARPENTER'S
IMPROVED
WOOD SIEVES FOR GAS PURIFIERS.

WORKS:
14, JOHN STREET, PENTONVILLE ROAD,
LONDON, N.

The above Sieves are used by the principal Gas Companies in London and the country. Their utility, durability, and cheapness combined, render them superior to all others.

Testimonials from Gas Engineers who have tested their qualities forwarded on application.

All orders punctually attended to, and estimates given if required.

Mr. H. GORE,
CONSULTING GAS ENGINEER,
20, ALFRED PLACE, BEDFORD SQUARE, LONDON, W.C.

OXIDE OF IRON,
We are prepared to supply, on moderate terms,
HYDRATED PEROXIDE OF IRON (BOG OCHRE),
Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.

FRANCIS RITCHIE & SONS,
BELFAST.

CAST-IRON Retorts, Socket Pipes, with Syphons and all requisite Connexions, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Pails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Borings.

PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas-Works, in stock, on wholesale prices, at

Mr. LYNCH WHITE'S,
Old Barge Iron Wharf, Upper Ground Street,
LONDON.

CATHELS'S Patent Dry District GOVERNOR is the only perfect self-acting contrivance for regulating the pressures in the higher levels of a district.

CATHELS'S Patent Four-way Disc GAS-VALVE—ONE OF WHICH SERVES AS THREE ORDINARY VALVES—is the best Valve for gas-works.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

CATHELS'S Patent Ribbed Gas Main-PIPES cost but about 1d. to 2d. per yard (depending on the size) more than Plain Pipes, and ensure PERFECT GAS-TIGHT CONNEXIONS with the Service-Pipes.

Apply to Messrs. BEGGS & SON, 37, Southampton Street, Strand, LONDON.

TESTIMONIAL.

Abingdon Gaslight and Coke Company, Limited, Offices and Works, Thames Street, June 25, 1868.

Mr. E. S. CATHELS.

Sir,—We have recently relaid a great portion of our town with your Patent Pipe, and I have much pleasure in bearing testimony to its merits. I find from our fitters that there is not the tendency to split when large services are put in that we find in the ordinary pipe of the smaller sizes, and, from having a greater thickness to drill and tap into, there is less liability to leakage at the connexion.

I am, sir, yours respectfully,
JOHN TOMKINS, Chairman.

NOTICE.

Suffolk Street, Clerkenwell Green, London, June 24, 1868.

As sole Executrix of the late Mr. Thomas Glover, permit me to inform you that I have taken into Partnership his brother, Mr. John Glover, who for upwards of 20 years has had the sole management of the Manufacturing Department, and I have secured the services of the same efficient staff of skilled workmen who have for so many years been connected with the Establishment, which I trust will be a sufficient guarantee that the article manufactured will maintain its well-known high character.

All orders that you may be pleased to forward shall receive the same prompt and careful attention as heretofore.

The business will be conducted under the style and title of "Thomas Glover & Co.," and will shortly be carried on at the extensive new factory erected by the late Mr. Glover, in St. John Street, Clerkenwell Green, which his enlarged business rendered requisite.

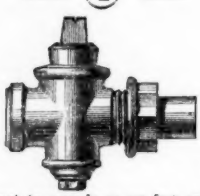
I am, yours truly,
AGNES R. GLOVER.

Referring to the annexed letter, I beg to say I have entered into Partnership with Mrs. Glover, the widow of my late brother, and respectfully solicit a continuance of your esteemed orders, which shall at all times command my best attention.

Yours respectfully,
JOHN GLOVER.

LAMBERTS
PATENT GALVANIZED IRON COCKS,
WITH WHITE METAL PLUGS.

TRADE (L) MARK.



Warranted not to corrode or set fast, and are 50 per cent. cheaper than Brass Cocks.

THOMAS LAMBERT AND SONS,
Manufacturers,
SHORT STREET, LAMBETH, LONDON.

HENRY F. WILLEY,
(Manager for the late Mr. Vickary, of Exeter, 15 years,)
GAS ENGINEER AND CONTRACTOR.
WORKS: BARTHOLOMEW STREET, EXETER.

Improved Wet and Dry Meters. Gas Apparatus and Gas-Fittings Manufacturer.
Contractor for the Erection of Gas-Works, Gasholders, Station-Meters, Governors, and every article and apparatus appertaining to Gas-Works.

A GREAT SAVING OF TIME, LABOUR, & EXPENSE
IS EFFECTED BY THE USE OF
PRICE'S
PATENT COAL AND COKE BARROWS.

In addition to other testimonials the following has recently been received from one of the largest Gas Companies in London :—

London Gaslight Company, Nine Elms, May 18, 1868.

Dear Sir,—The Patent Coke Barrows are a great improvement, and a saving both in time and labour.

Yours truly, D. WATSON.

They are in use in the Government, Metropolitan, and several country Gas-Works.

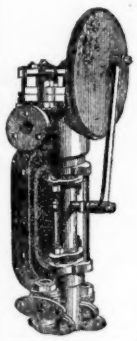
Manufacturers for London and South of England—PRIEST & WOOLNOUGH, KINGSTON-ON-THAMES.

Manufacturers for the Midland Counties and North of England—
THE COALBROOKDALE COMPANY, NEAR WELLINGTON, SALOP.

Manufacturers for Ireland—J. EDMUNDSON AND CO., CAPEL STREET, DUBLIN.

Communications to be addressed to the Sole Agent, R. E. KEEN, 50, Claremont Road, Surbiton, S.W.; or either of the above.

ALEXANDER WILSON & CO., ENGINEERS,
VAUXHALL IRON-WORKS, NINE ELMS, LONDON, S.W.,
MANUFACTURERS OF
IMPROVED DONKEY PUMPS,
INJECTORS, SAFETY-VALVES, STOP-VALVES, AND BOILER MOUNTINGS OF EVERY DESCRIPTION.



Special attention is called to their New Improved Donkey Pumps, which are the best boiler feeders yet brought before the users of steam power. For boilers supplying steam to apparatus other than a steam-engine they are indispensable, and are rapidly supplanting the use of the feed-pump in the engine. They are also largely used in gas-works for pumping ammoniacal liquor, &c., in all parts of the world.

REDUCED PRICE LIST.
Those marked * are double-acting.

Size.	Diameter.	Stroke.	Gals. thrown per Hour.	H.P. of Boiler supplied.	Price.
No. 4	1¼ Inch.	2½ Inch.	150	10	£6 10 0
5	1½	3	230	15	8 10 0
6	1¾	4	460	30	11 0 0
7	2⅛	4	600	40	13 0 0
*8	2¼	4	900	60	15 10 0
9	2⅝	6	1200	75	17 0 0
*10	2¾	6	1800	120	19 0 0

WOLVERHAMPTON RETORT WORKS.
ESTABLISHED **1840.**
JOHN EUNSON AND SON,
GAS ENGINEERS, AND MANUFACTURERS OF CLAY RETORTS,
AND FIRE GOODS IN GENERAL,
WOLVERHAMPTON.
Retort Mouthpieces, Bolts, Nuts, and every description of Wrought-Iron Work.

1862.

PATENT ANTIMONY PAINT.
MADE ONLY BY
GEORGE HALLETT & CO.,
296, ROTHERHITHE, LONDON, S.E.

CLASS II.

This Paint having been in general use over six years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (28s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

Reference is kindly permitted by the Engineers of the City of London, Commercial, London, and Surrey Consumers Gas Companies, who pronounce it the best Paint known for their purposes.

N.B.—Antimony Paint, **COVERING SO MUCH MORE WORK, costs under 20s. per cwt.,** as compared with White Lead at 28s. per cwt.; a similar economy arises from its use in Steam and Gas Joints, for which purpose it is superior to White Lead.

THE LIQUID METER COMPANY,
LIMITED.

A. A. CROLL, Chairman. GEORGE RAIT, Managing Director.

238, KINGSLAND ROAD, LONDON, N.E.

GEORGE ANDERSON,
GAS AND CONSULTING ENGINEER,

19, NORTHUMBERLAND STREET, STRAND, W.C.

MR. ANDERSON advises Companies on all matters connected with the manufacture of Gas and the construction of Works.

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS, heated by tar without the production of smoke.
STEAM-ENGINES and EXHAUSTERS, separately or combined.
FOUR-WAY VALVES, one of which is equal to three ordinary Valves.
STATION GOVERNORS—the Gasholder cannot tilt and cause accident.

BREEZE AND TAR FUEL MACHINE.

A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress on the construction of Works, post free, 2s. 6d.

N.B.—The second edition of this Work, *now ready*, contains illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.

"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

TO MANAGERS OF GAS-WORKS.

MANN'S IMPROVED SCRUBBER.

See Description and Sketch in "JOURNAL OF GAS LIGHTING," March 31, 1868.

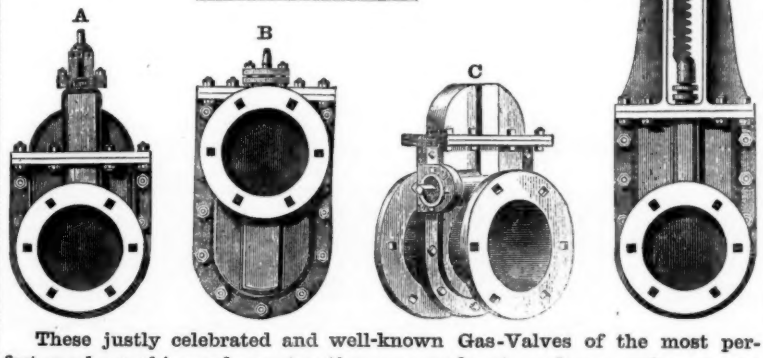
MESSRS. WESTWOOD & WRIGHTS are prepared to submit estimates for the supply and erection complete of the above, either in London or the Provinces.

MESSRS. W. & W. have already constructed several, which are now in successful operation, and give great satisfaction.

In cases where Scrubbers are already constructed, estimates will be submitted for altering and adapting to this principle.

Messrs. WESTWOOD and WRIGHTS,
No. 4, WHARF, CANAL ROAD, KINGSLAND ROAD, LONDON, N.
HOPE BOILER & GASOMETER WORKS,
BRIERLEY HILL, STAFFORDSHIRE, NEAR DUDLEY.

C. & W. WALKERS'
WEDGE GAS-VALVES.



These justly celebrated and well-known Gas-Valves of the most perfect workmanship and construction are made at as low a price as any other kind.

A—Above-ground Screw Gas-Valve, with improved indicator to show when open and shut, is the best kind of Valve for heavy pressures, such as the oxide of iron purification.
B—Under-ground Screw Gas-Valve.
C—Internal Rack Gas-Valve, with wrought-iron pinions.
D—Ordinary Rack and Pinion Valve, with strong undamageable racks and pinions.

MIDLAND IRON-WORKS,
DONNINGTON, NEWPORT, SHROPSHIRE.

PURIFICATION OF GAS.

FRODINGHAM IRONSTONE MINES,
NEAR
BRIGG, LINCOLNSHIRE.

Gas Companies can be supplied, from these Mines with OXIDE of IRON, for the purification of Gas, on reasonable terms, and in any quantity that may be required.

This material is a natural Oxide, and is supplied to Gas Companies as taken from the Mines, without any admixture of deleterious matter. It acts freely, and will purify a much larger quantity of gas per ton, than the generality of the material now in use under this name.

It will be found highly beneficial in large establishments, where they are liable to be called upon occasionally to make a much greater quantity of gas than usual, as well as in small establishments where they are limited in space, as by its adoption a much larger quantity of gas can in much less time be purified with the same quantity of material.

Apply to Mr. JAMES SHERWOOD, at the Mines; or to Mr. LIVESEY, 6, Victoria Street, WESTMINSTER, London Agent.

NO NECESSITY
FOR
CANNEL COAL

If POPE and PEARSON'S GAS COAL is used.

WEST RIDING AND SILKSTONE COLLIERIES, NEAR LEEDS.

NINETEEN YEARS PRACTICAL EXPERIENCE.

EDWIN BENTLEY,
RETORT SETTER,
29, LOWER HOPE STREET, HALIFAX,
YORKSHIRE.

Fire-Clay and Iron Retorts, Double and Single Grooved Brick Retorts, of every description.

Bentley's Improved D Brick Segment Retorts, 5 or 3 in one bed.

Testimonials and references on application.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.

Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

TO GAS AND WATER COMPANIES.

SECOND-HAND
FIRE AND BURGLAR PROOF
SAFES.

BEFORE PURCHASING SEND FOR
GRIFFITHS' MONTHLY LIST OF SAFES,
By Milner, Marr, Thos. Perry and Sons, Mordan, Price, Whitfield, and every eminent maker, at about half the price of new.

A guarantee given with each.

A large quantity of TANN'S SAFES from £2 10s.

Apply to GRIFFITHS, 43, CANNON STREET, E.C.

FRASER'S PATENT RIBBED
RETORTS.

These Retorts are now used at more than 60 Gas-Works, and continue to give satisfaction.

The Iron Retort is recommended for great durability. The Clay Ovens and Retorts obtain a more speedy and perfect carbonization of the Coal.

To ensure the excellence of the Brick Ovens and Fire-Clay Retorts, the Patentee has made arrangements with the following makers for their supply:—

MESSRS. J. CLIFF & SON, Wortley, near Leeds.
E. BAKER & CO., Stourbridge.
W. COCHRANE CARR, Newcastle-on-Tyne.
W. FRASER, Inverkeithing, N.B.

Full particulars, with illustrated circular, testimonials, and prices, will be forwarded on application to A. C. FRASER, Gas-Works, COLCHESTER.

STOURBRIDGE FIRE-CLAY WORKS.

E. BAKER & CO.,
24 WHARF, HARROW ROAD, PADDINGTON, W.

FIRE-BRICKS, LUMPS, SQUARES, and TILES of all dimensions.

GAS-RETORTS always in stock.

GARDEN EDGINGS of various patterns.

ORNAMENTAL BUILDING BRICKS.

GRATE BACKS in various designs.

Contracts entered into to set Retorts, erect Furnaces, &c.

Shipments on the shortest notice.

Makers of A. C. FRASER'S Patent Ribbed Retorts and Brick Ovens.

THE
PROPOSED WATER SUPPLY
FOR
THE METROPOLIS.

Just published, price 6d., by post 7d.,
A LECTURE
DELIVERED AT THE
ROYAL INSTITUTION OF GREAT BRITAIN,
On Friday, April 3, 1868,
BY DR. FRANKLAND, F.R.S.,
ON THE
Proposed Water Supply for the Metropolis.

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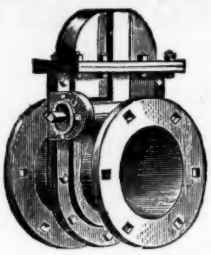

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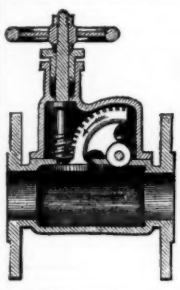

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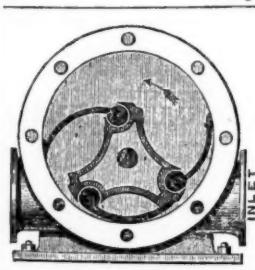

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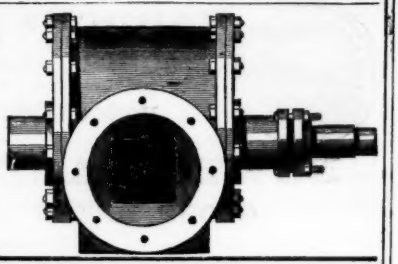

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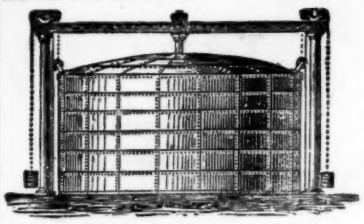

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